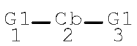
```
=> FIL REG
FILE 'REGISTRY' ENTERED AT 10:24:44 ON 25 OCT 2010
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2010 American Chemical Society (ACS)

=> D HIS NOFILE

     FILE 'HCA' ENTERED AT 08:21:36 ON 25 OCT 2010
                E US2007-551576/APPS
L1             1 SEA SPE=ON  ABB=ON  PLU=ON  US2007-551576/AP
                SEL L1 RN

     FILE 'REGISTRY' ENTERED AT 08:21:46 ON 25 OCT 2010
L2             4 SEA SPE=ON  ABB=ON  PLU=ON  (124949-97-9/BI OR 361482-41-
                9/BI OR 775342-45-5/BI OR 7664-93-9/BI)

     FILE 'HCA' ENTERED AT 08:21:53 ON 25 OCT 2010
                SEL L1 AU
L3            78 SEA SPE=ON  ABB=ON  PLU=ON  ("CHARNOCK, PETER"/AU OR
                "DEVINE, JOHN NEIL"/AU OR "WILSON, BRIAN"/AU)
                SEL L1 PA
L4            40 SEA SPE=ON  ABB=ON  PLU=ON  "VICTREX MANUFACTURING
                LIMITED UK"/PA

     FILE 'REGISTRY' ENTERED AT 08:22:15 ON 25 OCT 2010
                ACT WEI576/A
               ---------
L5              SCR 2043
L6              STR
L7         72693 SEA SSS FUL L6 AND L5
               ---------
                ACT WEI576A/A
               ---------
L8              SCR 2043
L9              STR
L10 (      72693)SEA SSS FUL L9 AND L8
L11             STR
L12        14752 SEA SUB=L10 SSS FUL L11
               ---------
                ACT WEI576C/A
               ---------
L13             SCR 2043
L14             STR
L15 (      72693)SEA SSS FUL L14 AND L13
L16             STR
L17          241 SEA SUB=L15 SSS FUL L16
               ---------
                ACT WEI576B/A
               ---------
L18             SCR 2043
L19             STR
L20 (      72693)SEA SSS FUL L19 AND L18
L21             STR
L22        14541 SEA SUB=L20 SSS FUL L21
               ---------
                ACT WEI576D/A
               ---------
L23             SCR 2043
```

```
L24             STR
L25 (     72693)SEA SSS FUL L24 AND L23
L26             STR
L27         205 SEA SUB=L25 SSS FUL L26
               ---------
                ACT WEI576E/A
               ---------
L28             SCR 2043
L29             STR
L30 (     72693)SEA SSS FUL L29 AND L28
L31             STR
L32       13283 SEA SUB=L30 SSS FUL L31
               ---------
                ACT WEI576F/Q
               ---------
L33             STR
               ---------
L34          50 SEA SUB=L7 SSS SAM L33
L35             STR L33
L36          50 SEA SUB=L7 SSS SAM L35
L37        4081 SEA SUB=L7 SSS FUL L35
                SAV L37 WEI576F/A
                E SULFURIC ACID/CN
L38           1 SEA SPE=ON  ABB=ON  PLU=ON  "SULFURIC ACID"/CN
L39       14511 SEA SPE=ON  ABB=ON  PLU=ON  L12 NOT L17
L40       14336 SEA SPE=ON  ABB=ON  PLU=ON  L22 NOT L27
L41          17 SEA SPE=ON  ABB=ON  PLU=ON  L34 AND (L39 OR L40)
L42           1 SEA SPE=ON  ABB=ON  PLU=ON  L34 AND (L17 OR L27)
L43        1801 SEA SPE=ON  ABB=ON  PLU=ON  L37 AND (L39 OR L40)
L44          39 SEA SPE=ON  ABB=ON  PLU=ON  L37 AND (L17 OR L27)

     FILE 'HCA' ENTERED AT 08:48:33 ON 25 OCT 2010
L45             QUE SPE=ON  ABB=ON  PLU=ON  ?SULPHONAT? OR ?SULFONAT?
L46     1013826 SEA SPE=ON  ABB=ON  PLU=ON  ?MEMBRAN?
L47     1044725 SEA SPE=ON  ABB=ON  PLU=ON  ANOD#### OR CATHOD#### OR
                ELECTROD####
L48     1997077 SEA SPE=ON  ABB=ON  PLU=ON  L46 OR L47
L49         330 SEA SPE=ON  ABB=ON  PLU=ON  L39 (L) L45
L50         138 SEA SPE=ON  ABB=ON  PLU=ON  L17
L51         830 SEA SPE=ON  ABB=ON  PLU=ON  L40 (L) L45
L52          63 SEA SPE=ON  ABB=ON  PLU=ON  L27
L53           1 SEA SPE=ON  ABB=ON  PLU=ON  L41 (L) L45
L54           1 SEA SPE=ON  ABB=ON  PLU=ON  L42
L55          33 SEA SPE=ON  ABB=ON  PLU=ON  L43 (L) L45
L56          27 SEA SPE=ON  ABB=ON  PLU=ON  L44
L57             QUE SPE=ON  ABB=ON  PLU=ON  ?CRYST?
L58         135 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L49
L59          63 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L50
L60         691 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L51
L61          42 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L52
L62           1 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L53
L63           1 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L54
L64          24 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L55
L65          19 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L56
L66          28 SEA SPE=ON  ABB=ON  PLU=ON  (L58 OR L59 OR L60 OR L61)
                AND L57
L67      142802 SEA SPE=ON  ABB=ON  PLU=ON  L38
L68          77 SEA SPE=ON  ABB=ON  PLU=ON  (L58 OR L59 OR L60 OR L61)
                AND L67
L69         886 SEA SPE=ON  ABB=ON  PLU=ON  L58 OR L59 OR L60 OR L61 OR
```

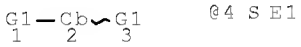
```
                L62 OR L63 OR L64 OR L65 OR L66 OR L68
L70           5 SEA SPE=ON  ABB=ON  PLU=ON  L69 AND (L3 OR L4)
L71         881 SEA SPE=ON  ABB=ON  PLU=ON  L69 NOT L70
L72         298 SEA SPE=ON  ABB=ON  PLU=ON  1802-2004/PY,PRY,AY AND L71
L73      105803 SEA SPE=ON  ABB=ON  PLU=ON  FUEL? (2A) CELL?
L74         166 SEA SPE=ON  ABB=ON  PLU=ON  L72 AND L73

     FILE 'REGISTRY' ENTERED AT 09:21:14 ON 25 OCT 2010
                ACT WEI576E/A
               ---------
L75             SCR 2043
L76             STR
L77 (      72693)SEA SSS FUL L76 AND L75
L78             STR
L79        13283 SEA SUB=L77 SSS FUL L78
               ---------
L80         3127 SEA SPE=ON  ABB=ON  PLU=ON  L79 AND (L39 OR L40)
L81          230 SEA SPE=ON  ABB=ON  PLU=ON  L79 AND (L17 OR L27)

     FILE 'HCA' ENTERED AT 09:24:00 ON 25 OCT 2010
L82          865 SEA SPE=ON  ABB=ON  PLU=ON  L80 (L) L45
L83           96 SEA SPE=ON  ABB=ON  PLU=ON  L81
L84          726 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L82
L85           78 SEA SPE=ON  ABB=ON  PLU=ON  L48 AND L83
L86          886 SEA SPE=ON  ABB=ON  PLU=ON  L58 OR L59 OR L60 OR L61 OR
                L64 OR L65 OR L84 OR L85 OR L66 OR L68
L87            5 SEA SPE=ON  ABB=ON  PLU=ON  L86 AND (L3 OR L4)
L88          881 SEA SPE=ON  ABB=ON  PLU=ON  L86 NOT L87
L89          298 SEA SPE=ON  ABB=ON  PLU=ON  1802-2004/PY,PRY,AY AND L88
L90          166 SEA SPE=ON  ABB=ON  PLU=ON  L89 AND L73
L91          155 SEA SPE=ON  ABB=ON  PLU=ON  (L84 OR L85) AND L90
L92          155 SEA SPE=ON  ABB=ON  PLU=ON  L91 NOT L87
L93           11 SEA SPE=ON  ABB=ON  PLU=ON  (L64 OR L65) AND L90
L94           11 SEA SPE=ON  ABB=ON  PLU=ON  L93 NOT L87
L95            5 SEA SPE=ON  ABB=ON  PLU=ON  L66 AND L90
L96            5 SEA SPE=ON  ABB=ON  PLU=ON  L95 NOT L87
L97           21 SEA SPE=ON  ABB=ON  PLU=ON  L68 AND L90
L98           21 SEA SPE=ON  ABB=ON  PLU=ON  L97 NOT L87
L99          166 SEA SPE=ON  ABB=ON  PLU=ON  (L58 OR L59 OR L60 OR L61)
                AND L90
L100           9 SEA SPE=ON  ABB=ON  PLU=ON  L99 NOT (L98 OR L96 OR L94
                OR L92)
                SEL L92 11 21 31 41 51 61 71 81 91 101 111 121 131 141 15
L101          15 SEA SPE=ON  ABB=ON  PLU=ON  ("130:82473"/AN OR "133:13781
                9"/AN OR "136:121088"/AN OR "137:110259"/AN OR "138:17327
                4"/AN OR "139:215541"/AN OR "139:367516"/AN OR "140:14901
                0"/AN OR "140:409513"/AN OR "141:280351"/AN OR "142:17788
                7"/AN OR "143:17776"/AN OR "143:250965"/AN OR "144:111204
                "/AN OR "144:394674"/AN)
L102          15 SEA SPE=ON  ABB=ON  PLU=ON  L92 AND L101
L103         140 SEA SPE=ON  ABB=ON  PLU=ON  L92 NOT L102
                SAV L103 WEI576G/A


     FILE 'REGISTRY' ENTERED AT 10:24:44 ON 25 OCT 2010

=> D L12 QUE STAT
L8              SCR 2043
L9              STR
```




VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 2
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS E6 C AT 2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 3

STEREO ATTRIBUTES: NONE
L10 ( 72693)SEA FILE=REGISTRY SSS FUL L9 AND L8
L11 STR



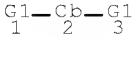

VAR G1=OH/4
NODE ATTRIBUTES:
HCOUNT IS E1 AT 4
CONNECT IS E1 RC AT 4
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 2
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS E6 C AT 2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 4

STEREO ATTRIBUTES: NONE
L12 14752 SEA FILE=REGISTRY SUB=L10 SSS FUL L11

100.0% PROCESSED 72693 ITERATIONS 14752 ANSWERS
SEARCH TIME: 00.00.01

=> D L17 QUE STAT
L13 SCR 2043
L14 STR




VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM

```
GGCAT   IS UNS  AT   2
DEFAULT ECLEVEL IS LIMITED
ECOUNT  IS E6 C  AT   2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   3

STEREO ATTRIBUTES: NONE
L15 (     72693)SEA FILE=REGISTRY SSS FUL L14 AND L13
L16             STR
```


```
VAR G1=OH/4
NODE ATTRIBUTES:
HCOUNT  IS E1     AT   4
CONNECT IS E1  RC AT   4
DEFAULT MLEVEL IS ATOM
GGCAT   IS UNS  AT   2
DEFAULT ECLEVEL IS LIMITED
ECOUNT  IS E6 C  AT   2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   5

STEREO ATTRIBUTES: NONE
L17         241 SEA FILE=REGISTRY SUB=L15 SSS FUL L16

100.0% PROCESSED    4339 ITERATIONS                          241 ANSWERS
SEARCH TIME: 00.00.01


=> D L22 QUE STAT
L18             SCR 2043
L19             STR
```


```
VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT   IS UNS  AT   2
DEFAULT ECLEVEL IS LIMITED
ECOUNT  IS E6 C  AT   2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   3

STEREO ATTRIBUTES: NONE
L20 (     72693)SEA FILE=REGISTRY SSS FUL L19 AND L18
```

L21 STR

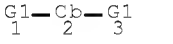

VAR G1=4/O
VAR G2=4/6/O
NODE ATTRIBUTES:
HCOUNT IS E1 AT 6
CONNECT IS E2 RC AT 4
CONNECT IS E1 RC AT 6
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 1
GGCAT IS UNS AT 3
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS E6 C AT 1

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 6

STEREO ATTRIBUTES: NONE
L22 14541 SEA FILE=REGISTRY SUB=L20 SSS FUL L21

100.0% PROCESSED 72693 ITERATIONS 14541 ANSWERS
SEARCH TIME: 00.00.01

=> D L27 QUE STAT
L23 SCR 2043
L24 STR

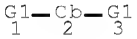



VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 2
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS E6 C AT 2

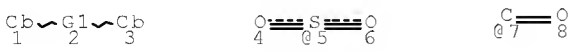
GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 3

STEREO ATTRIBUTES: NONE
L25 ( 72693)SEA FILE=REGISTRY SSS FUL L24 AND L23
L26 STR

```
VAR G1=4/O
VAR G2=4/6/O
NODE ATTRIBUTES:
HCOUNT  IS E1     AT   6
CONNECT IS E2  RC AT   4
CONNECT IS E1  RC AT   6
DEFAULT MLEVEL IS ATOM
GGCAT   IS UNS  AT   1
GGCAT   IS UNS  AT   3
DEFAULT ECLEVEL IS LIMITED
ECOUNT  IS E6 C  AT   1

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   7

STEREO ATTRIBUTES: NONE
L27         205 SEA FILE=REGISTRY SUB=L25 SSS FUL L26

100.0% PROCESSED    4339 ITERATIONS                          205 ANSWERS
SEARCH TIME: 00.00.01



=> D L79 QUE STAT
L75             SCR 2043
L76             STR
```




```
VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT   IS UNS  AT   2
DEFAULT ECLEVEL IS LIMITED
ECOUNT  IS E6 C  AT   2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   3

STEREO ATTRIBUTES: NONE
L77 (     72693)SEA FILE=REGISTRY SSS FUL L76 AND L75
L78             STR
```




```
VAR G1=5/7
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT   IS UNS  AT   1
GGCAT   IS UNS  AT   3
DEFAULT ECLEVEL IS LIMITED
```

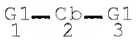
ECOUNT IS E6 C AT 1
ECOUNT IS E6 C AT 3

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 8

STEREO ATTRIBUTES: NONE
L79 13283 SEA FILE=REGISTRY SUB=L77 SSS FUL L78

100.0% PROCESSED 53556 ITERATIONS 13283 ANSWERS
SEARCH TIME: 00.00.01

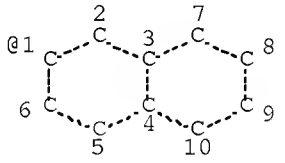
=> D L37 QUE STAT
L5 SCR 2043
L6 STR

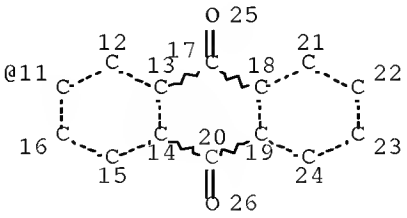


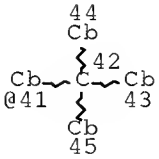

VAR G1=O/S
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
GGCAT IS UNS AT 2
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS E6 C AT 2

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 3

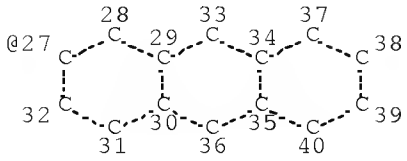
STEREO ATTRIBUTES: NONE
L7 72693 SEA FILE=REGISTRY SSS FUL L6 AND L5
L35 STR

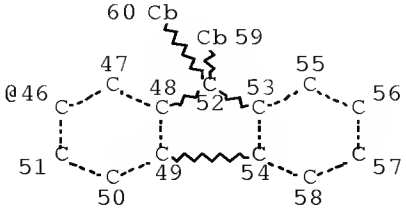






G1 8

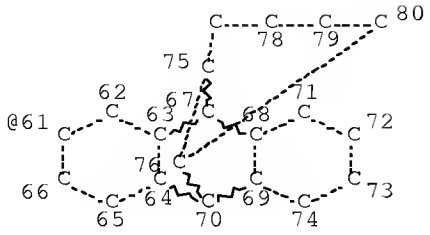




Page 1-A

1

Page 1-B



Page 2-A
VAR G1=1/11/41/27/46/61
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
MLEVEL IS CLASS AT 77 78 79 80
GGCAT IS UNS AT 41
GGCAT IS UNS AT 43
GGCAT IS UNS AT 44
GGCAT IS UNS AT 45
GGCAT IS UNS AT 59
GGCAT IS UNS AT 60
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS UNLIMITED AT 77 78 79 80
ECOUNT IS E6 C AT 41
ECOUNT IS E6 C AT 43
ECOUNT IS E6 C AT 44
ECOUNT IS E6 C AT 45
ECOUNT IS E6 C AT 59
ECOUNT IS E6 C AT 60

GRAPH ATTRIBUTES:
RSPEC I
NUMBER OF NODES IS 81

STEREO ATTRIBUTES: NONE
L37 4081 SEA FILE=REGISTRY SUB=L7 SSS FUL L35

100.0% PROCESSED 72693 ITERATIONS 4081 ANSWERS
SEARCH TIME: 00.00.01

=> FIL HCA
FILE 'HCA' ENTERED AT 10:25:57 ON 25 OCT 2010
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

----------(APPLICANTS)----------

=> D L87 1-5 IBIB ABS HITSTR HITIND RETABLE

L87 ANSWER 1 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:352743 HCA Full-text
TITLE: Polymer electrolyte membrane or gas diffusion electrode for fuel cells
INVENTOR(S): Charnock, Peter; Devine, John Neil; Wilson, Brian
PATENT ASSIGNEE(S): Victrex Manufacturing Limited, UK
SOURCE: PCT Int. Appl., 51 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2004088778 | A2 | 20041014 | WO 2004-GB1401 | 20040401 |
| WO 2004088778 | A3 | 20050616 | | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| AU 2004226638 | A1 | 20041014 | AU 2004-226638 | 20040401 |
| AU 2004226638 | B2 | 20100909 | | |
| CA 2520650 | A1 | 20041014 | CA 2004-2520650 | 20040401 |
| EP 1614170 | A2 | 20060111 | EP 2004-725090 | 20040401 |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, HR | | | | |
| JP 2006524415 | T | 20061026 | JP 2006-506066 | 20040401 |
| US 20070269700 | A1 | 20071122 | US 2007-551576 | 20070410 |
| PRIORITY APPLN. INFO.: | | | GB 2003-7623 A | 20030402 |

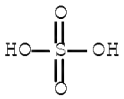
WO 2004-GB1401 W 200404 01

AB A polymer electrolyte membrane or gas diffusion electrode includes an ion-conducting polymeric material which includes moieties of formula -X-m-C6H4-X- which are substituted on average with more than 1 and 3 or fewer groups (e.g. sulfonate groups) which provide ion-exchange sites and hydrogen atoms of the moieties are optionally substituted, wherein each X in the moieties of formula are independently represent an oxygen or sulfur atom. The ion conducting polymeric material is suitably prepared by controllably sulfonating a polymeric material using about 100% sulfuric acid at 34° to 36°.

IT 7664-93-9, Sulfuric acid, processes
(polymer electrolyte membrane or gas diffusion electrode for fuel cells)

RN 7664-93-9 HCA

CN Sulfuric acid (CA INDEX NAME)



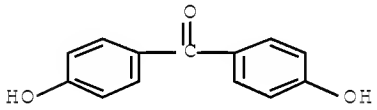
IT 124949-97-9DP, sulfonated 775342-45-5DP, sulfonated
(polymer electrolyte membrane or gas diffusion electrode for fuel cells)

RN 124949-97-9 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,3-benzenediol and bis(4-hydroxyphenyl)methanone (CA INDEX NAME)

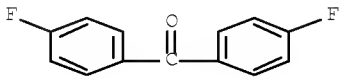
CM 1

CRN 611-99-4
CMF C13 H10 O3



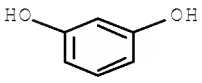
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

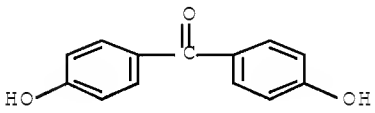
CRN 108-46-3
CMF C6 H6 O2



RN 775342-45-5 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,3-benzenediol, bis(4-hydroxyphenyl)methanone and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

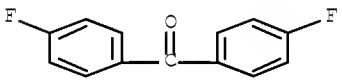
CM 1

CRN 611-99-4
CMF C13 H10 O3



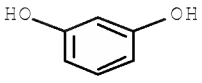
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



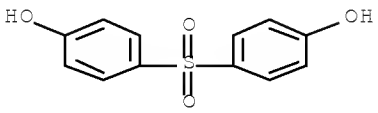
CM 3

CRN 108-46-3
CMF C6 H6 O2



CM 4

CRN 80-09-1
CMF C12 H10 O4 S



IPCI H01M0008-00 [ICM,7]
IPCR B01D0071-00 [I,C*]; B01D0071-52 [I,A]; B01D0071-68 [I,A]; B01D0071-82 [I,A]; C08G0065-00 [I,C*]; C08G0065-48 [I,A]; C08G0075-00 [I,C*]; C08G0075-23 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell polymer electrolyte membrane gas diffusion electrode
IT Fuel cell electrodes
(gas diffusion; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Polyketones
(polyether-, sulfonated; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Polysulfones, uses
(polyether-polyketone-; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Polyketones
(polyether-polysulfone-; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Polyethers, preparation
(polyketone-, sulfonated; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Polyethers, uses
(polyketone-polysulfone-; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Conducting polymers
Fuel cell electrolytes
Sulfonation
(polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT Fuel cells
(polymer electrolyte; polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT 7664-93-9, Sulfuric acid, processes
(polymer electrolyte membrane or gas diffusion electrode for fuel cells)
IT 124949-97-9DP, sulfonated 124949-97-9P 361482-41-9DP, sulfonated 361482-41-9P 775342-45-5DP, sulfonated 775342-45-5P
(polymer electrolyte membrane or gas diffusion electrode for fuel cells)
RETABLE
Referenced Author |Year | VOL | PG | Referenced Work |
Referenced

| (RAU) | (RPY) | (RVL) | (RPG) | (RWK) | File |
|---|---|---|---|---|---|
| Anon | | | | WO 0119896 A1 | HCA |
| Anon | | | | EP 0382440 A1 | HCA |
| Anon | | | | US 4273903 A | HCA |
| Anon | | | | US 5362836 A | HCA |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L87 ANSWER 2 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 138:274118 HCA Full-text
TITLE: Electrochemical cells
INVENTOR(S): Devine, John Neil; Wilson, Brian
PATENT ASSIGNEE(S): Victrex Manufacturing Limited, UK
SOURCE: PCT Int. Appl., 34 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2003028139 | A2 | 20030403 | WO 2002-GB4242 | 200209 18 |
| WO 2003028139 | A3 | 20040401 | | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| CA 2454697 | A1 | 20030403 | CA 2002-2454697 | 200209 18 |
| AU 2002329405 | A1 | 20030407 | AU 2002-329405 | 200209 18 |
| AU 2002329405 | B2 | 20080501 | | |
| EP 1430559 | A2 | 20040623 | EP 2002-765031 | 200209 18 |
| EP 1430559 | B1 | 20070530 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK | | | | |
| JP 2005504421 | T | 20050210 | JP 2003-531548 | 200209 18 |
| AT 363740 | T | 20070615 | AT 2002-765031 | 200209 18 |

US 20040258999 A1 20041223 US 2004-490422 200404 28

US 7799465 B2 20100921

PRIORITY APPLN. INFO.: GB 2001-23109 A 200109 26

WO 2002-GB4242 W 200209 18

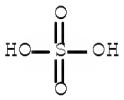
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB There is described a fuel cell or electrolytic cell comprising an ion-conductive polymeric material which includes a first repeat unit of formula : - (O-Ph1-CO-Ph1-O-Ph1-CO-Ph1) -, and a second repeat unit of formula : - (O-Ph2-O-Ph3-CO-Ph4) -, or of formula : (O-Ph2-O-Ph3-SO2-Ph4) -; wherein Ph1, Ph2, Ph3 and Ph4 independently represent Ph moieties and wherein the second repeat unit is provided with ion-exchange sites. The polymeric material may include a third repeat unit which is amorphous.

IT 7664-93-9, Sulfuric acid, processes
(electrochem. cells)

RN 7664-93-9 HCA

CN Sulfuric acid (CA INDEX NAME)



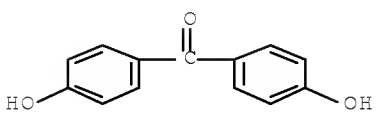
IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated
503540-87-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-diphenyl sulfone-hydroquinone copolymer, sulfonated
503540-89-4DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxydiphenyl sulfone-diphenyl sulfone-hydroquinone copolymer, sulfonated
(electrochem. cells)

RN 71957-60-3 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and bis(4-hydroxyphenyl)methanone (CA INDEX NAME)

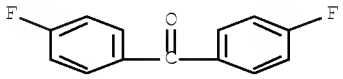
CM 1

CRN 611-99-4
CMF C13 H10 O3



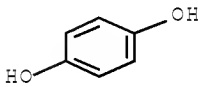
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

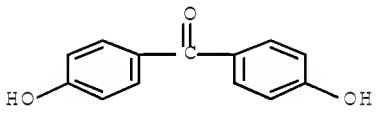
CRN 123-31-9
CMF C6 H6 O2



RN 503540-87-2 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol, bis(4-hydroxyphenyl)methanone and 1,1'-sulfonylbis[benzene] (9CI) (CA INDEX NAME)

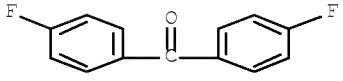
CM 1

CRN 611-99-4
CMF C13 H10 O3



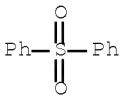
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



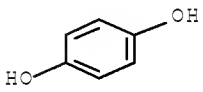
CM 3

CRN 127-63-9
CMF C12 H10 O2 S



CM 4

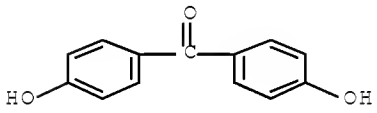
CRN 123-31-9
CMF C6 H6 O2



RN 503540-89-4 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol, bis(4-hydroxyphenyl)methanone, 1,1'-sulfonylbis[benzene] and 4,4'-sulfonylbis[phenol] (9CI) (CA INDEX NAME)

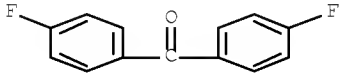
CM 1

CRN 611-99-4
CMF C13 H10 O3



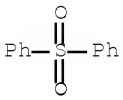
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



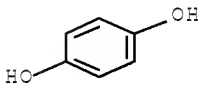
CM 3

CRN 127-63-9
CMF C12 H10 O2 S



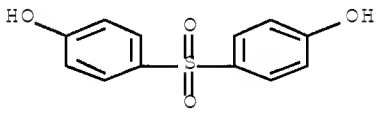
CM 4

CRN 123-31-9
CMF C6 H6 O2



CM 5

CRN 80-09-1
CMF C12 H10 O4 S



IPCI H01M0008-10 [ICM,7]
IPCR C08J0005-20 [I,C*]; C08J0005-22 [I,A]; B01D0071-00 [I,C*]; B01D0071-00 [I,A]; C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C25B0009-00 [I,C*]; C25B0009-00 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01B0001-12 [I,C*]; H01B0001-12 [I,A]; H01M0002-16 [I,C*]; H01M0002-16 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72
IT 7664-93-9, Sulfuric acid, processes
(electrochem. cells)
IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated 503540-87-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-diphenyl sulfone-hydroquinone copolymer, sulfonated 503540-89-4DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxydiphenyl sulfone-diphenyl sulfone-hydroquinone copolymer, sulfonated
(electrochem. cells)
IT 7732-18-5, Water, processes

(uptake, of polymer membranes; electrochem. cells)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Anon | | | | US 4268650 A | HCA |
| Anon | | | | US 4273903 A | HCA |
| Anon | | | | US 4320224 A | HCA |
| Anon | | | | US 4413106 A | HCA |
| Anon | | | | US 4419486 A | HCA |

L87 ANSWER 3 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 137:265674 HCA Full-text
TITLE: Fuel cell powered by direct fuel
INVENTOR(S): Andrews, Mark James; Lockley, John Edward; Wilson, Brian
PATENT ASSIGNEE(S): Victrex Manufacturing Limited, UK
SOURCE: PCT Int. Appl., 72 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2002075835 | A2 | 20020926 | WO 2002-GB1379 | 200203 21 |
| WO 2002075835 | A3 | 20031016 | | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| CA 2440964 | A1 | 20020926 | CA 2002-2440964 | 200203 21 |
| AU 2002241152 | A1 | 20021003 | AU 2002-241152 | 200203 21 |
| AU 2002241152 | B2 | 20080228 | | |
| EP 1374330 | A2 | 20040102 | EP 2002-706992 | 200203 21 |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR | | | | |
| JP 2004528683 | T | 20040916 | JP 2002-574147 | 200203 21 |
| US 20040157102 | A1 | 20040812 | US 2004-472227 | 200404 |

| | | | | |
|---|---|---|---|---|
| US 7303830 | B2 | 20071204 | | |
| PRIORITY APPLN. INFO.: | | | GB 2001-7075 | A 20010321 |
| | | | GB 2001-23085 | A 20010926 |
| | | | WO 2002-GB1379 | W 20020321 |

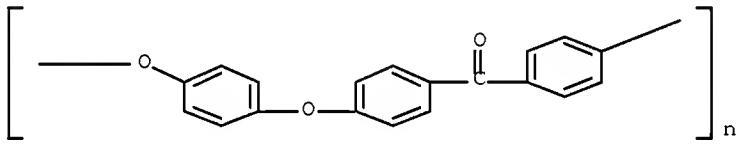
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A fuel cell powered by direct fuel, for example a direct methanol fuel cell, includes a polymer electrolyte membrane which includes a semicryst. polymer. Preferred semicryst. polymers include first repeat units comprising sulfonated aromatic group containing moieties linked by -SO2- and/or -CO- and/or -Q- groups, where Q is O or S and second repeat units which include aromatic group containing moieties linked by -CO- and/or Q groups.

IT 31694-16-3DP, PEEK 450P, sulfonated
(fuel cell powered by direct fuel)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IPCI H01M0008-10 [ICM,7]; B01D0071-06 [ICS,7]; B01D0071-00 [ICS,7,C*]; C08G0065-48 [ICS,7]; C08G0065-00 [ICS,7,C*]; C08J0005-22 [ICS,7]; C08J0005-20 [ICS,7,C*]; H01B0001-12 [ICS,7]

IPCR H01M0008-02 [I,C*]; H01M0008-02 [I,A]; B01D0067-00 [I,C*]; B01D0067-00 [I,A]; B01D0071-00 [I,C*]; B01D0071-52 [I,A]; B01D0071-68 [I,A]; C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08L0071-00 [I,C*]; C08L0071-00 [I,A]; C08L0081-00 [I,C*]; C08L0081-06 [I,A]; H01B0001-12 [I,C*]; H01B0001-12 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT Crystallinity
Fuel cell electrolytes
(fuel cell powered by direct fuel)

IT Polymers, uses
(semicryst., sulfonated; fuel cell powered by direct fuel)

IT 27380-27-4DP, sulfonated 31694-16-3DP, PEEK 450P, sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxybenzophenone copolymer, sulfonated 128324-23-2P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-

dihydroxydiphenylsulfone copolymer, sulfonated 128324-24-3P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-41-9DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 361482-41-9P, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer 361482-42-0DP, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 361482-42-0P, 4,4'-Difluorobenzophenone-2,4'-dihydroxybenzophenone-4,4'-dihydroxybenzophenone 4,4'-dihydroxybiphenyl copolymer 362518-55-6P 362518-57-8P
(fuel cell powered by direct fuel)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Anon | | | | WO 0015691 A1 | HCA |
| Anon | | | | WO 0170857 A2 | HCA |
| Anon | | | | WO 0171839 A2 | HCA |
| Anon | | | | EP 0688824 A2 | HCA |
| Anon | | | | DE 19847782 A1 | HCA |
| Anon | | | | WO 9629752 A1 | HCA |
| Anon | | | | WO 9719480 A1 | HCA |
| Anon | | | | WO 9822989 A1 | HCA |
| Anon | | | | WO 9850457 A1 | HCA |

OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD (4 CITINGS)

L87 ANSWER 4 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 135:243473 HCA Full-text
TITLE: Preparation of ion conducting polymers and composite electrolyte membrane therefrom
INVENTOR(S): Charnock, Peter; Wilson, Brian ; Bridges, Richard Frank
PATENT ASSIGNEE(S): Victrex Manufacturing Limited, UK
SOURCE: PCT Int. Appl., 63 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2001070858 | A2 | 20010927 | WO 2001-GB1243 | 200103 21 |
| WO 2001070858 | A3 | 20011227 | | |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG

| | | | | |
|---|---|---|---|---|
| CA 2402840 | A1 | 20010927 | CA 2001-2402840 | 200103 21 |
| CA 2402840 | C | 20101005 | | |
| AU 2001039406 | A | 20011003 | AU 2001-39406 | 200103 21 |
| EP 1268619 | A2 | 20030102 | EP 2001-914017 | 200103 21 |

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR

| | | | | |
|---|---|---|---|---|
| JP 2003528188 | T | 20030924 | JP 2001-569052 | 200103 21 |
| AU 2001239406 | B2 | 20051103 | AU 2001-239406 | 200103 21 |
| US 20040005474 | A1 | 20040108 | US 2002-239143 | 200212 19 |
| US 6902801 | B2 | 20050607 | | |
| PRIORITY APPLN. INFO.: | | | GB 2000-6883 A | 200003 22 |
| | | | GB 2000-31209 A | 200012 21 |
| | | | WO 2001-GB1243 W | 200103 21 |

AB A composite material, for example a composite membrane for a polymer electrolyte membrane fuel cell includes a first conductive polymer and a support material for the polymer, wherein the support material comprises a second conductive polymer. A method making of the composite material is also disclosed as is its use as a polymer electrolyte membrane in a fuel cell. Thus, a microporous ion conducting membrane prepared by casting a solution containing a 1:1 blend of polyetherketone and a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybenzophenone, and 4,4'-dihydroxybiphenyl was impregnated with a 15% solution of a sulfonated copolymer of 4,4'-difluorobenzophenone, 4,4'-dihydroxybiphenyl, and 4,4'-dihydroxydiphenylsulfone and the composite membrane was strong and flexible.

IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated
(preparation of ion conducting polymers for composite electrolyte membrane)

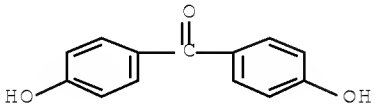
RN 71957-60-3 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and bis(4-hydroxyphenyl)methanone (CA INDEX NAME)

CM 1

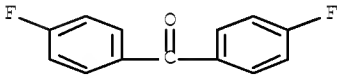
CRN 611-99-4

CMF C13 H10 O3



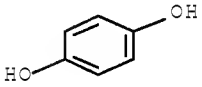
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

CRN 123-31-9
CMF C6 H6 O2



IPCI C08J0005-22 [ICM,7]; C08J0005-20 [ICM,7,C*]
IPCR C08J0005-20 [I,A]; B01D0067-00 [I,C*]; B01D0067-00 [I,A]; B01D0069-00 [I,C*]; B01D0069-12 [I,A]; B01D0071-00 [I,C*]; B01D0071-52 [I,A]; B01D0071-68 [I,A]; B01D0071-80 [I,A]; B01D0071-82 [I,A]; C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35, 76
ST sulfonated polymer ion conducting membrane prepn; fuel cell membrane polymer electrolyte ion conducting
IT Membranes, nonbiological
(composite, microporous; preparation of ion conducting polymers for composite electrolyte membrane)
IT Polyketones
(polyether-, aromatic, sulfonated, reaction products; preparation of ion conducting polymers for composite electrolyte membrane)
IT Polysulfones, uses
(polyether-, sulfonated; preparation of ion conducting polymers for composite electrolyte membrane)
IT Polyethers, uses
(polyketone-, aromatic, sulfonated, reaction products; preparation of ion

conducting polymers for composite electrolyte membrane)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-containing; in preparation of ion conducting polymers for composite electrolyte membrane)
IT Polyethers, uses
(polysulfone-, sulfonated; preparation of ion conducting polymers for composite electrolyte membrane)
IT Conducting polymers
Polymer electrolytes
(preparation of ion conducting polymers for composite electrolyte membrane)
IT Polymer blends
(preparation of ion conducting polymers for composite electrolyte membrane)
IT Fuel cells
(preparation of ion conducting polymers for composite electrolyte membrane in fuel cell)
IT 71957-60-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-hydroquinone copolymer, sulfonated 83094-08-0DP, 4,4'-Dichlorodiphenylsulfone 4,4'-dihydroxybiphenyl 4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated
(preparation of ion conducting polymers for composite electrolyte membrane)
IT 27380-27-4
(preparation of ion conducting polymers for composite electrolyte membrane)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Anon | | | | WO 0015691 A1 | HCA |
| Anon | | | | WO 0119896 A1 | HCA |
| Anon | | | | EP 0574791 A2 | HCA |
| Anon | | | | WO 9850457 A1 | HCA |
| Anon | | | | WO 9851733 A1 | HCA |

OS.CITING REF COUNT: 8 THERE ARE 8 CAPLUS RECORDS THAT CITE THIS RECORD (9 CITINGS)

L87 ANSWER 5 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 132:237553 HCA Full-text
TITLE: Polyoxyphenylene ion-exchange polymers
INVENTOR(S): Charnock, Peter; Kemmish, David John; Staniland, Philip Anthony; Wilson, Brian
PATENT ASSIGNEE(S): Victrex Manufacturing Ltd., UK
SOURCE: PCT Int. Appl., 64 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| WO 2000015691 | A1 | 20000323 | WO 1999-GB2833 | 199909 10 |
| W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW | | | | |
| RW: GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| CA 2343184 | A1 | 20000323 | CA 1999-2343184 | 199909 10 |
| CA 2343184 | C | 20100629 | | |
| AU 9957509 | A | 20000403 | AU 1999-57509 | 199909 10 |
| AU 764333 | B2 | 20030814 | | |
| EP 1112301 | A1 | 20010704 | EP 1999-944684 | 199909 10 |
| EP 1112301 | B1 | 20060906 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, CY | | | | |
| JP 2002524631 | T | 20020806 | JP 2000-570225 | 199909 10 |
| EP 1493770 | A2 | 20050105 | EP 2004-77086 | 199909 10 |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY | | | | |
| AT 338785 | T | 20060915 | AT 1999-944684 | 199909 10 |
| CA 2382144 | A1 | 20010322 | CA 2000-2382144 | 200009 08 |
| CA 2382144 | C | 20081202 | | |
| WO 2001019896 | A1 | 20010322 | WO 2000-GB3449 | 200009 08 |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG | | | | |
| AU 2000070250 | A | 20010417 | AU 2000-70250 | 200009 08 |
| AU 778365 | B2 | 20041202 | | |
| EP 1228122 | A1 | 20020807 | EP 2000-958834 | 200009 08 |
| EP 1228122 | B1 | 20070228 | | |

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL

| | | | | |
|---|---|---|---|---|
| JP 2003509554 | T | 20030311 | JP 2001-523671 | 20000908 |
| AT 355319 | T | 20060315 | AT 2000-958834 | 20000908 |
| US 6828353 | B1 | 20041207 | US 2001-787011 | 20010312 |
| US 20040242710 | A1 | 20041202 | US 2004-875198 | 20040625 |
| US 6969755 | B2 | 20051129 | | |
| PRIORITY APPLN. INFO.: | | | GB 1998-19706 A | 19980911 |
| | | | GB 1998-20940 A | 19980928 |
| | | | GB 1999-13572 A | 19990611 |
| | | | EP 1999-944684 A3 | 19990910 |
| | | | WO 1999-GB2833 W | 19990910 |
| | | | GB 2000-6884 A | 20000322 |
| | | | WO 2000-GB3449 W | 20000908 |
| | | | US 2001-787011 A1 | 20010312 |

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

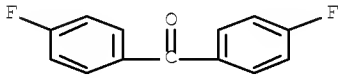
AB Ion-Exchange polymers for a polymer electrolyte membrane include the repeating units EAr(C6H4)mE' (I), C6H4CO(C6H4)wG[(C6H4)rCOC6H4]s (II), and/or C6H4SO2(C6H4)zG[(C6H4)tSO2C6H4]v (III) wherein at least some of the units I, II and/or III are sulfonated; wherein the Ph moieties in units I, II, and III are independently optionally substituted and optionally cross-linked; and wherein m, r, s, t, v, w and z independently represent zero or a pos. integer, E and E' independently represent an oxygen or a sulfur atom or a direct link, G represents an oxygen or sulfur atom, a direct link or a -O-Ph-O- moiety where Ph represents a Ph group and Ar is selected from one of the above moieties (i) to (x) which is bonded via one or more of its Ph moieties to adjacent moieties.

IT 104570-14-1DP, sulfonated

(polyoxyphenylene ion-exchange polymers)
RN 104570-14-1 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and [1,1'-biphenyl]-4,4'-diol (CA INDEX NAME)

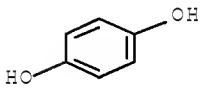
CM 1

CRN 345-92-6
CMF C13 H8 F2 O



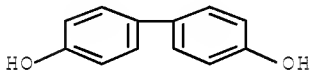
CM 2

CRN 123-31-9
CMF C6 H6 O2



CM 3

CRN 92-88-6
CMF C12 H10 O2



IPCI C08G0065-48 [ICM,7]; C08G0065-00 [ICM,7,C*]; C08J0005-22 [ICS,7]; C08J0005-20 [ICS,7,C*]; H01M0006-18 [ICS,7]; H01M0010-40 [ICS,7]; H01M0010-36 [ICS,7,C*]; H01M0008-10 [ICS,7]; H01M0002-16 [ICS,7]
IPCR B01D0053-22 [I,C*]; B01D0053-22 [I,A]; B01D0071-00 [I,C*]; B01D0071-66 [I,A]; C08G0065-00 [I,C*]; C08G0065-38 [I,A]; C08G0065-48 [I,A]; C08G0075-00 [I,C*]; C08G0075-20 [I,A]; C08G0075-23 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 35-5 (Chemistry of Synthetic High Polymers)
ST sulfonated polyoxyphenylene ion exchange electrolyte membrane
IT Membranes, nonbiological
(electrolyte; polyoxyphenylene ion-exchange polymers)
IT Electrodes
(gas-diffusion; polyoxyphenylene ion-exchange polymers)

IT Electrolytes
(membrane; polyoxyphenylene ion-exchange polymers)
IT 25718-32-5DP, sulfonated 83094-08-0DP, sulfonated 88033-16-3DP, sulfonated 104570-14-1DP, sulfonated 105777-36-4DP, sulfonated 116875-10-6P 125430-17-3DP, sulfonated 125431-57-4DP, sulfonated 128324-23-2DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybenzophenone-4,4'-dihydroxybiphenyl copolymer, sulfonated 128324-24-3DP, 4,4'-Difluorobenzophenone-4,4'-dihydroxybiphenyl-4,4'-dihydroxydiphenylsulfone copolymer, sulfonated 139357-70-3DP, sulfonated 261638-66-8P 261638-67-9DP, sulfonated
(polyoxyphenylene ion-exchange polymers)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Commissariat Energie At | 1997 | | | FR 2748485 A | HCA |
| Hoechst Ag | 1993 | | | EP 0574791 A | HCA |
| Ici Plc | 1980 | | | EP 0008895 A | HCA |
| Ici Plc | 1990 | | | EP 0382440 A | HCA |
| Joachim, C | 1996 | | | WO 9629360 A | HCA |
| Sumitomo Chemical Co | 1999 | | | EP 0932213 A | HCA |
| Union Carbide Corp | 1987 | | | EP 0211693 A | HCA |

OS.CITING REF COUNT: 20 THERE ARE 20 CAPLUS RECORDS THAT CITE THIS RECORD (20 CITINGS)

----------(CARBONYL OR SULPHONE MOIETIES--CLAIM 3)----------

=> D L102 1-15 IBIB ABS HITSTR HITIND RETABLE

L102 ANSWER 1 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:394674 HCA Full-text
TITLE: Fuel cell apparatus and method of manufacture thereof
INVENTOR(S): Jeon, Yoocham
PATENT ASSIGNEE(S): Hewlett-Packard Development Company, L.P., USA
SOURCE: U.S. Pat. Appl. Publ., 36 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| US 20060083852 | A1 | 20060420 | US 2004-968724 <-- | 20041018 |
| WO 2006044845 | A1 | 20060427 | WO 2005-US37345 <-- | 20051018 |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM,

KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK,
MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO,
RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ,
UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU,
IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD,
TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

| | | | | | |
|---|---|---|---|---|---|
| JP 2008517443 | T | 20080522 | JP 2007-537955 | | 200510 18 |
| | | | <-- | | |
| US 20060088747 | A1 | 20060427 | US 2005-297910 | | 200512 09 |
| | | | <-- | | |
| PRIORITY APPLN. INFO.: | | | US 2004-968724 | A | 200410 18 |
| | | | <-- | | |
| | | | WO 2005-US37345 | W | 200510 18 |

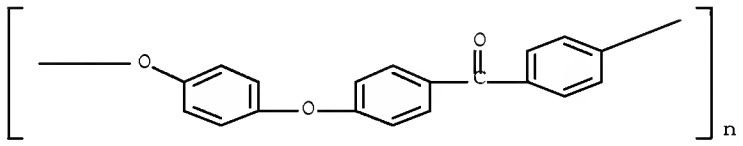
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Metal-coated polymer electrolyte membranes permeable to protons/hydrogen and methods of manufacturing thereof are disclosed. A fuel cell may be produced using a substrate, with the resultant design having a thin metal layer, such as palladium, positioned between two layers of a porous metal, such as palladium black, and optionally at least one layer of a polymer electrolyte. An alternate design uses at least one layer of a porous metal, such as palladium black, and optionally one or more layers of platinum black, in combination with a mold, sacrificial layer, and optional microstructure.

IT 31694-16-3D, PEEK, sulfonated
(fuel cell apparatus and method of manufacture thereof)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



INCL 427115000; 429034000; 429030000; 429033000; 429040000

IPCI B05D0005-12 [I,A]; H01M0008-10 [I,A]; H01M0008-02 [I,A]; H01M0004-92 [I,A]; H01M0004-90 [I,C*]

IPCR B05D0005-12 [I,A]; B05D0005-12 [I,C]; H01M0004-90 [I,C]; H01M0004-92 [I,A]; H01M0008-02 [I,C]; H01M0008-02 [I,A]; H01M0008-10 [I,C]; H01M0008-10 [I,A]

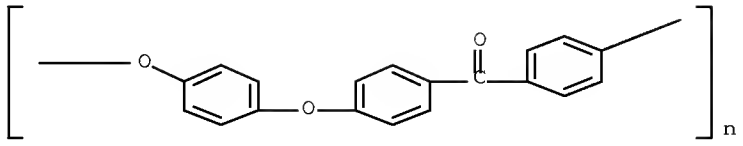
NCL 427/115.000; 429/494.000; 429/524.000; 429/534.000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST polymer electrolyte membrane fuel cell
fabrication

IT Fuel cell electrolytes
(fuel cell apparatus and method of manufacture thereof)
IT Coating materials
(palladium black; fuel cell apparatus and method of manufacture thereof)
IT Sulfonic acids
(perfluorosulfonic acid polymers; fuel cell apparatus and method of manufacture thereof)
IT Coating materials
(platinum black; fuel cell apparatus and method of manufacture thereof)
IT Polyketones
(polyether-, sulfonated; fuel cell apparatus and method of manufacture thereof)
IT Polyethers
(polyketone-, sulfonated; fuel cell apparatus and method of manufacture thereof)
IT Fuel cells
(polymer electrolyte; fuel cell apparatus and method of manufacture thereof)
IT Fluoropolymers
(sulfo-containing, perfluoro; fuel cell apparatus and method of manufacture thereof)
IT 12779-05-4
(black; fuel cell apparatus and method of manufacture thereof)
IT 31694-16-3D, PEEK, sulfonated
(fuel cell apparatus and method of manufacture thereof)
IT 7440-05-3, Palladium, uses
(fuel cell apparatus and method of manufacture thereof)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L102 ANSWER 2 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:111204 HCA Full-text
TITLE: Synthesis of nanostructured materials for biosensor and fuel cell applications
AUTHOR(S): Gil, Maria Paula
CORPORATE SOURCE: Tulane Univ., New Orleans, LA, USA
SOURCE: (2004) 125 pp. Avail.: UMI, Order No. DA3170324
From: Diss. Abstr. Int., B 2005, 66(3), 1585
DOCUMENT TYPE: Dissertation
LANGUAGE: English
AB Unavailable
IT 31694-16-3
(sulfonated, membranes; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 9
ST nanostructure platinum nanowire glucose sensor; fuel cell separators sulfonated PEEK membrane nanostructure
IT Biosensors
(enzymic, for glucose; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT Fuel cell separators
Glucose sensors
(nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT Polyketones
(polyether-, sulfonated, membranes; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT Polyethers, uses
(polyketone-, sulfonated, membranes; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT 7440-06-4, Platinum, uses
(nanowires; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT 50-99-7, D-Glucose, analysis
(sensors; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)
IT 31694-16-3
(sulfonated, membranes; nanostructured materials for platinum nanowire-based glucose biosensors sensors and sulfonated PEEK membranes for fuel cells)

L102 ANSWER 3 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:250965 HCA Full-text
TITLE: Manufacture of proton-conductive membrane with improved characteristics by surface treatment for fuel cell electrolyte
INVENTOR(S): Okada, Takashi; Kadota, Mayumi; Yoshii, Kimihiko
PATENT ASSIGNEE(S): JSR Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 19 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005226047 | A | 20050825 | JP 2004-38727 | 200402 16 |

<-- 

PRIORITY APPLN. INFO.: JP 2004-38727 200402 16

<--

AB The membrane is manufactured by forming a film containing acidic ion-conductive component-containing polymers and hydrophilizing or peeling the film. Preferably, the hydrophilizing or peeling step is carried out by bringing the film into contact with O3 or irradiating UV to the film. The manufactured membrane with improved proton conductivity and adhesion to electrodes is also claimed.

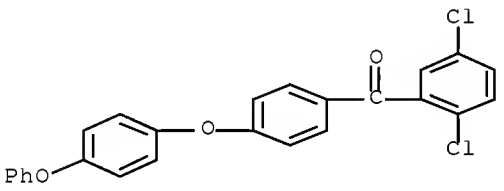
IT 847356-67-6DP, sulfonated
(manufacture of proton-conductive membrane with improved characteristics by surface treatment for fuel cell electrolyte)

RN 847356-67-6 HCA

CN Methanone, bis(4-hydroxyphenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 1,1'-sulfonylbis[4-chlorobenzene], block (9CI) (CA INDEX NAME)

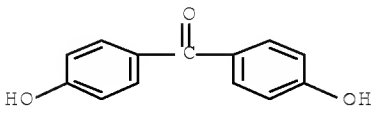
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



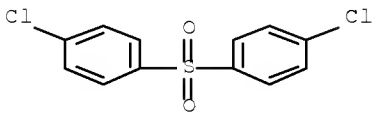

CM 2

CRN 611-99-4
CMF C13 H10 O3




CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IPCI C08J0007-00 [ICM,7]; C08G0065-40 [ICS,7]; C08G0065-00 [ICS,7,C*];
H01B0001-06 [ICS,7]; H01B0013-00 [ICS,7]; H01M0008-02 [ICS,7];
H01M0008-10 [ICS,7]; C08L0071-08 [ICS,7]; C08L0071-00 [ICS,7,C*]
IPCR C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08J0007-00 [I,A];
C08J0007-00 [I,C*]; H01B0001-06 [N,A]; H01B0001-06 [N,C*];
H01B0013-00 [N,A]; H01B0013-00 [N,C*]; H01M0008-02 [N,A];
H01M0008-02 [N,C*]; H01M0008-10 [N,A]; H01M0008-10 [N,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76
ST proton conductive polymer membrane fuel
cell electrolyte; hydrophilization surface treatment proton
conductive polymer membrane manuf; peeling surface
treatment proton conductive polymer membrane manuf
IT Perfluoro compounds
(alkanesulfonic acids, polymers; manufacture of proton-conductive
membrane with improved characteristics by surface
treatment for fuel cell electrolyte)
IT Sulfonic acids, uses
(alkanesulfonic, perfluoro, polymers; manufacture of proton-conductive
membrane with improved characteristics by surface
treatment for fuel cell electrolyte)
IT Fuel cell electrolytes
Membranes, nonbiological
(manufacture of proton-conductive membrane with improved
characteristics by surface treatment for fuel
cell electrolyte)
IT Polysulfones, uses
(polyether-polyketone-, block, sulfonated; manufacture of
proton-conductive membrane with improved
characteristics by surface treatment for fuel
cell electrolyte)
IT Polyketones
(polyether-polysulfone-, block, sulfonated; manufacture of
proton-conductive membrane with improved
characteristics by surface treatment for fuel
cell electrolyte)
IT Polyethers, uses
(polyketone-polysulfone-, block, sulfonated; manufacture of
proton-conductive membrane with improved
characteristics by surface treatment for fuel
cell electrolyte)
IT Ionic conductors
(protonic; manufacture of proton-conductive membrane with
improved characteristics by surface treatment for fuel
cell electrolyte)
IT Ozonization
UV radiation
(surface treatment by; manufacture of proton-conductive

membrane with improved characteristics by surface treatment for fuel cell electrolyte)
IT 847356-67-6DP, sulfonated
(manufacture of proton-conductive membrane with improved characteristics by surface treatment for fuel cell electrolyte)
IT 66796-30-3, Nafion 117
(manufacture of proton-conductive membrane with improved characteristics by surface treatment for fuel cell electrolyte)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

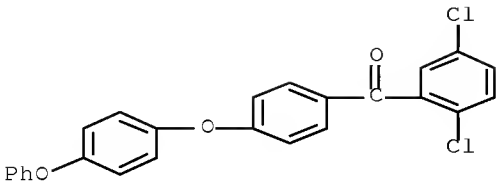
L102 ANSWER 4 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:17776 HCA Full-text
TITLE: Acid-base composite-type polymer electrolyte membrane
INVENTOR(S): Yamakawa, Yoshitaka; Otsuki, Toshitaka
PATENT ASSIGNEE(S): JSR Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 33 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005149949 | A | 20050609 | JP 2003-386859 | 200311 17 |
| | | | <-- | |
| JP 4512843 | B2 | 20100728 | | |
| PRIORITY APPLN. INFO.: | | | JP 2003-386859 | 200311 17 |
| | | | <-- | |

AB The membrane comprises sulfo-containing polyarylenes and polymers having functional groups (e.g., N-containing basic group) interactive to the sulfo groups. The membrane shows high proton conductivity in wire temperature region, good mech. properties, and low MeOH permeability and is suitable for fuel cells .
IT 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated
(acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)
RN 463963-71-5 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

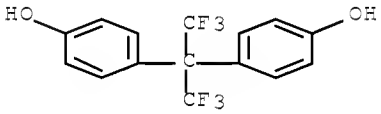
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



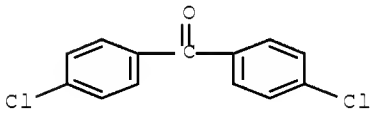
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IPCI H01B0001-06 [I,A]; C08L0065-00 [I,A]; C08L0101-02 [I,A]; C08L0101-00 [I,C*]; H01M0008-02 [N,A]; H01M0008-10 [N,A]
IPCR C08L0065-00 [I,A]; C08L0065-00 [I,C*]; C08L0101-00 [I,C*]; C08L0101-02 [I,A]; H01B0001-06 [I,A]; H01B0001-06 [I,C*]; H01M0008-02 [N,A]; H01M0008-02 [N,C*]; H01M0008-10 [N,A]; H01M0008-10 [N,C*]
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 38, 52
ST acid base composite polymer electrolyte membrane; fuel cell sulfo polyarylene basic polymer electrolyte membrane
IT Fuel cell electrolytes
Polymer electrolytes
(acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)
IT Polyketones
(polyether-, fluorine-containing; acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)
IT Fluoropolymers, uses

(polyether-polyketone-; acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)

IT Polyethers, uses
(polyketone-, fluorine-containing; acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)

IT Ionic conductors
(protonic; acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)

IT 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated
663920-28-3DP, Bisphenol AF-4,4'-dichlorobenzophenone-neopentyl 4-[4-(2,5-dichlorobenzoyl)phenoxy]benzenesulfonate copolymer, hydrolyzed
(acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)

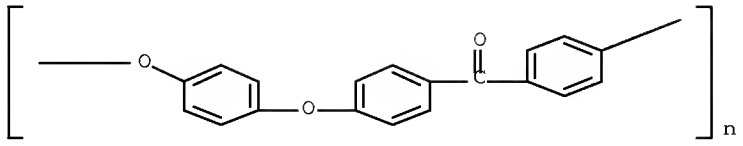
IT 9003-39-8, Poly(vinyl pyrrolidone)
(acid-base composite-type polymer electrolyte membrane containing sulfo-containing polyarylenes and sulfo-interactive group-containing polymers)

L102 ANSWER 5 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:177887 HCA Full-text
TITLE: Polymer sulfonation - a versatile route to preparing proton-conducting membrane material for advanced technologies
AUTHOR(S): Zaidi, S. M. Javaid
CORPORATE SOURCE: Chemical Engineering Department, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia
SOURCE: Arabian Journal for Science and Engineering, Section B: Engineering (2003), 28(2B), 183-194
CODEN: AJSEF2; ISSN: 1319-8025
PUBLISHER: King Fahd University of Petroleum and Minerals
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Sulfonation of polymers is a viable method for making proton exchange membranes used in electrochem. devices. Polyether-ether ketone was modified by using concentrated H2SO4 (97.4%) to produce ion-containing polymers bearing HSO3 groups. The sulfonated polymer was characterized for IEC, 1HNMR, DSC, and H2O uptake etc. The degree of sulfonation of sulfonated PEEK was found to vary 40-80 mol%. The PEEK became amorphous after sulfonation (DSC and WXRD), which enhanced its solubility in organic solvents such as DMF. The glass transition temperature, Tg increased from 151° for pure PEEK to 217° upon sulfonation. The H2O uptake was also increased with sulfonation level, which provides formation of water-mediated pathways for protons involving SO3H groups. The membranes from these polymers have a high potential for use in electrochem. devices such as polymer fuel cell and electrodialysis.

IT 31694-16-3DP, sulfonated
(sulfonated PEEK as proton-conducting membrane material)

RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



```
CC    38-3 (Plastics Fabrication and Uses)
      Section cross-reference(s): 37
ST    polyether polyketone sulfonated proton exchange membrane;
      fuel cell separator polyether polyketone
      sulfonated
IT    Polyketones
         (polyether-, sulfonated, aromatic; sulfonated PEEK as
         proton-conducting membrane material)
IT    Polyethers, uses
         (polyketone-, sulfonated, aromatic; sulfonated PEEK as
         proton-conducting membrane material)
IT    Sulfonation
         (property modification by; sulfonated PEEK as proton-conducting
         membrane material)
IT    Fuel cells
         (proton exchange membrane; sulfonated PEEK as
         proton-conducting membrane material)
IT    Ionic conductors
         (protonic; sulfonated PEEK as proton-conducting membrane
         material)
IT    Crystallinity
        Fuel cell separators
      Glass transition temperature
      Solubility
         (sulfonated PEEK as proton-conducting membrane
         material)
IT    31694-16-3DP, sulfonated
         (sulfonated PEEK as proton-conducting membrane
         material)
RETABLE
   Referenced Author   |Year | VOL | PG   | Referenced Work    |
Referenced
         (RAU)         |(RPY)|(RVL)|(RPG) |      (RWK)         | File
=======================+=====+=====+======+====================+=========
==
Appleby, A             |1996 |354  |1681  |Phil Trans Royal Soc|HCA
Atwood, T              |1979 |20   |191   |Polym Prep, Am Chem |
Bailly, C              |1987 |28   |1009  |Polymer             |HCA
Bellamy, L             |1966 |     |64    |The Infrared Spectra|
Bishop, M              |1985 |18   |86    |Macromolecules      |HCA
Cerfontain, H          |1968 |     |      |Mechanical Aspect in|
Cui, W                 |1998 |14   |145   |Separation and Purif|HCA
Drzewinkski, M         |1985 |30   |4753  |J Appl Polym Sci    |
Faure, S               |1997 |     |818   |2nd Int Symp on New |HCA
Jin, X                 |1985 |17   |4     |British Polym J     |HCA
Kobayashi, T           |1998 |106  |219   |Solid State Ionics  |HCA
Liler, M               |1971 |     |      |Reaction Mechanisms |
Nakanishi, K           |1962 |     |28    |Infrared Absorption |
Nolte, R               |1993 |83   |211   |J Membrane Sci      |HCA
Noshay, A              |1976 |20   |1885  |J Appl Polym Sci    |HCA
O'Gara, J              |1987 |25   |1519  |J Polym Sci B: Polym|HCA
```

| | | | | | |
|---|---|---|---|---|---|
| Rikukawam, K | 2000 | 25 | 1463 | Progress in Polymer | |
| Savadogo, O | 1998 | 1 | 66 | J New Mat Electroche | |
| Shoesmith, J | 1994 | 49 | 129 | J Power Source | HCA |
| Sivashinsky, N | 1983 | 28 | 3235 | J Appl Polym Sci | HCA |
| Steck, A | 1997 | | 792 | Proc 2nd Int Symp on | HCA |
| Zaidi, S | 2000 | 173 | 17 | J Membrane Science | HCA |
| Zaidi, S | 2000 | | | PhD Thesis, Laval Un | |

OS.CITING REF COUNT: 7 THERE ARE 7 CAPLUS RECORDS THAT CITE THIS RECORD (7 CITINGS)

L102 ANSWER 6 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:280351 HCA Full-text
TITLE: Polymer electrolyte material, polymer electrolyte parts, membrane-electrode laminate, and polymer electrolyte fuel cell
INVENTOR(S): Adachi, Shinya; Izuhara, Daisuke; Nakamura, Masataka; Ito, Nobuaki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: PCT Int. Appl., 147 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2004079844 | A1 | 20040916 | WO 2004-JP2894 | 20040305 |
| | | | <-- | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO | | | | |
| RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| JP 2004269599 | A | 20040930 | JP 2003-59569 | 20030306 |
| | | | <-- | |
| CA 2518414 | A1 | 20040916 | CA 2004-2518414 | 20040305 |
| | | | <-- | |
| EP 1619735 | A1 | 20060125 | EP 2004-717850 | 20040305 |
| | | | <-- | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK | | | | |
| CN 1757130 | A | 20060405 | CN 2004-80006115 | 20040305 |

<--

| | | | | |
|---|---|---|---|---|
| CN 100364160 | C | 20080123 | | |
| JP 2005174897 | A | 20050630 | JP 2004-121470 | 200404 16 |
| | | | <-- | |
| US 20060180796 | A1 | 20060817 | US 2005-548110 | 200509 06 |
| | | | <-- | |
| US 7713449 | B2 | 20100511 | | |

PRIORITY APPLN. INFO.:

| | |
|---|---|
| JP 2003-59569 | A 200303 06 |
| | <-- |
| JP 2003-116685 | A 200304 22 |
| | <-- |
| JP 2003-120115 | A 200304 24 |
| | <-- |
| JP 2003-386734 | A 200311 17 |
| | <-- |
| JP 2003-386735 | A 200311 17 |
| | <-- |
| WO 2004-JP2894 | W 200403 05 |
| | <-- |

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The electrolyte material has a nonfreezing water fraction (Rw1) of 20-100 in a hydrous state {Rw1 = [Wnf/(Wfc + Wnf)]; Wnf= amount of nonfreezing water per g of dry weight of polymer electrolyte material; and Wfc= amount of low m.p. water per g of dry weight of polymer electrolyte material}. The parts, the laminate, and the fuel cell use the above material. The fuel cell, using the above material, has excellent proton-conductivity and fuel cutoff properties and improved efficiency.

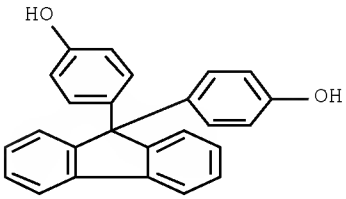
IT 116875-10-6D, sulfonated 116875-11-7D, sulfonated 125658-29-9D, sulfonated 132109-45-6D, sulfonated 132139-83-4D, sulfonated 136691-69-5D, sulfonated 146027-07-8D, sulfonated 146088-68-8D, sulfonated 199610-91-8D, sulfonated 758706-30-8D, sulfonated 758706-31-9D, sulfonated 758706-34-2D, sulfonated 758706-35-3D, sulfonated
(fuel cells containing polymer electrolyte materials with controlled nonfreezing water fraction for improved efficiency)

RN 116875-10-6 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

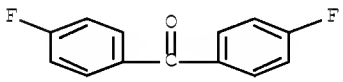
CM 1

CRN 3236-71-3
CMF C25 H18 O2



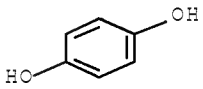
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

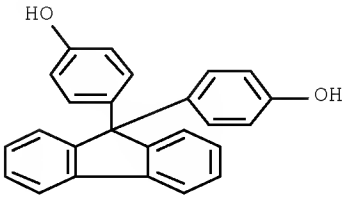
CRN 123-31-9
CMF C6 H6 O2



RN 116875-11-7 HCA
CN 1,4-Benzenediol, polymer with 4,4'-(9H-fluoren-9-ylidene)bis[phenol] and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

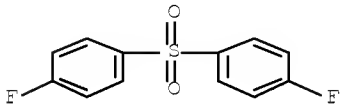
CM 1

CRN 3236-71-3
CMF C25 H18 O2



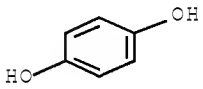
CM 2

CRN 383-29-9
CMF C12 H8 F2 O2 S



CM 3

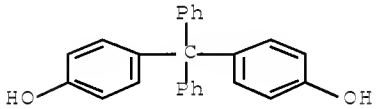
CRN 123-31-9
CMF C6 H6 O2



RN 125658-29-9 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(diphenylmethylene)bis[phenol] (9CI) (CA INDEX NAME)

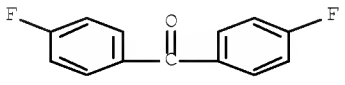
CM 1

CRN 1844-01-5
CMF C25 H20 O2



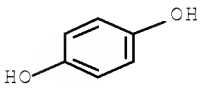
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

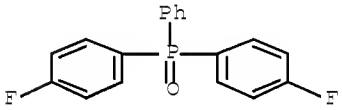
CRN 123-31-9
CMF C6 H6 O2



RN 132109-45-6 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide (9CI) (CA INDEX NAME)

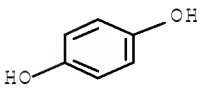
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P

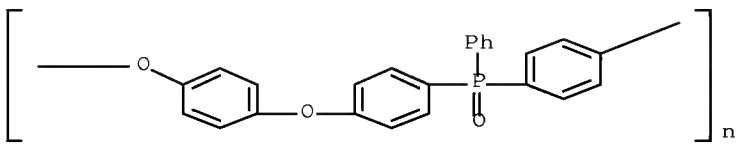


CM 2

CRN 123-31-9
CMF C6 H6 O2



RN 132139-83-4 HCA
CN Poly[oxy-1,4-phenyleneoxy-1,4-phenylene(phenylphosphinylidene)-1,4-phenylene] (9CI) (CA INDEX NAME)

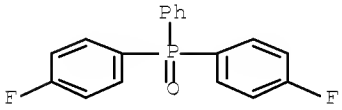


RN 136691-69-5 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and

bis(4-fluorophenyl)phenylphosphine oxide (9CI) (CA INDEX NAME)

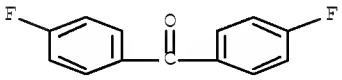
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



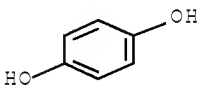
CM 2

CRN 345-92-6
CMF C13 H8 F2 O

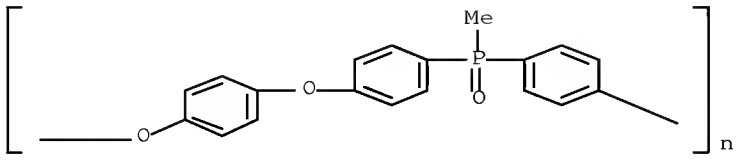


CM 3

CRN 123-31-9
CMF C6 H6 O2



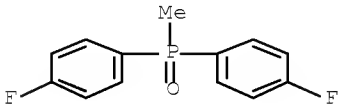
RN 146027-07-8 HCA
CN Poly[oxy-1,4-phenyleneoxy-1,4-phenylene(methylphosphinylidene)-1,4-phenylene] (9CI) (CA INDEX NAME)



RN 146088-68-8 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)methylphosphine oxide (9CI) (CA INDEX NAME)

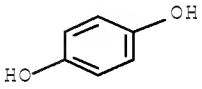
CM 1

CRN 25186-24-7
CMF C13 H11 F2 O P




CM 2

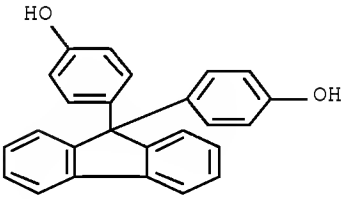
CRN 123-31-9
CMF C6 H6 O2




RN 199610-91-8 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,3-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (CA INDEX NAME)

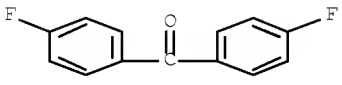
CM 1

CRN 3236-71-3
CMF C25 H18 O2



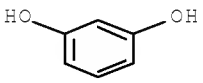

CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

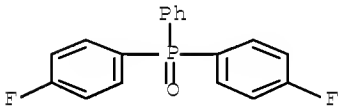
CRN 108-46-3
CMF C6 H6 O2



RN 758706-30-8 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

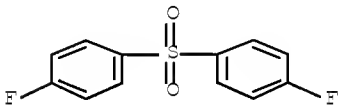
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



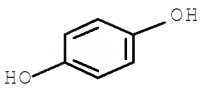
CM 2

CRN 383-29-9
CMF C12 H8 F2 O2 S



CM 3

CRN 123-31-9
CMF C6 H6 O2

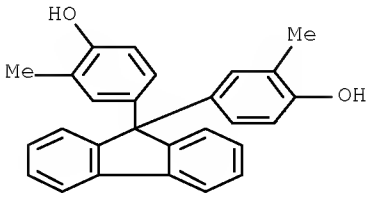


RN 758706-31-9 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[2-methylphenol] (9CI) (CA INDEX

NAME)

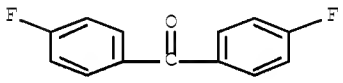
CM 1

CRN 88938-12-9
CMF C27 H22 O2



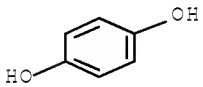

CM 2

CRN 345-92-6
CMF C13 H8 F2 O




CM 3

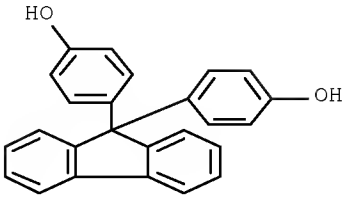
CRN 123-31-9
CMF C6 H6 O2




RN 758706-34-2 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-2,5-diol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

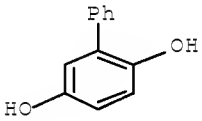
CM 1

CRN 3236-71-3
CMF C25 H18 O2



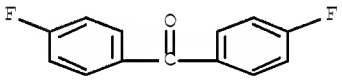
CM 2

CRN 1079-21-6
CMF C12 H10 O2



CM 3

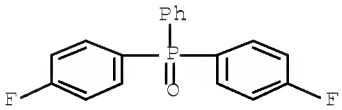
CRN 345-92-6
CMF C13 H8 F2 O



RN 758706-35-3 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

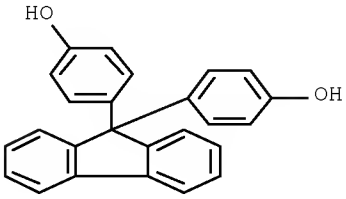
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



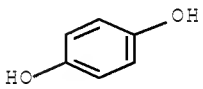
CM 2

CRN 3236-71-3
CMF C25 H18 O2




CM 3

CRN 123-31-9
CMF C6 H6 O2




IPCI H01M0008-02 [ICM,7]; C08G0079-04 [ICS,7]; C08G0079-00 [ICS,7,C*];
C08G0075-02 [ICS,7]; C08G0075-20 [ICS,7]; C08G0075-00 [ICS,7,C*];
C08G0065-40 [ICS,7]; C08G0065-00 [ICS,7,C*]; H01B0001-06 [ICS,7]
IPCR C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08G0075-00 [I,C*];
C08G0075-02 [I,A]; C08G0075-20 [I,A]; C08G0079-00 [I,C*];
C08G0079-04 [I,A]; C09K0005-00 [I,C*]; C09K0005-20 [I,A];
H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01B0001-12 [I,C*];
H01B0001-12 [I,A]; H01M0004-86 [N,C*]; H01M0004-86 [N,A];
H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-90 [N,C*];
H01M0004-92 [N,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A];
H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*];
H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell polymer electrolyte material
nonfreezing water fraction control
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-containing, ionomers; fuel
cells containing polymer electrolyte materials with
controlled nonfreezing water fraction for improved efficiency)
IT Fuel cell electrolytes
Fuel cells
(fuel cells containing polymer electrolyte
materials with controlled nonfreezing water fraction for improved
efficiency)
IT Carbon fibers, uses
Fluoropolymers, uses
(fuel cells containing polymer electrolyte
materials with controlled nonfreezing water fraction for improved
efficiency)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-containing, ionomers; fuel
cells containing polymer electrolyte materials with

controlled nonfreezing water fraction for improved efficiency)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-containing; fuel cells containing polymer electrolyte materials with controlled nonfreezing water fraction for improved efficiency)
IT 7440-44-0, Carbon, uses 9002-84-0, PTFE 12779-05-4 65978-77-0D, sulfonated 106444-61-5D, sulfonated 108809-07-0D, sulfonated 116875-10-6D, sulfonated 116875-11-7D, sulfonated 122159-35-7D, sulfonated 123349-32-6D, sulfonated 125658-29-9D, sulfonated 132109-45-6D, sulfonated 132139-83-4D, sulfonated 136691-69-5D, sulfonated 146027-07-8D, sulfonated 146088-68-8D, sulfonated 199610-91-8D, sulfonated 349672-97-5D, sulfonated 673477-33-3D, sulfonated 758706-29-5D, sulfonated 758706-30-8D, sulfonated 758706-31-9D, sulfonated 758706-32-0D, sulfonated 758706-33-1D, sulfonated 758706-34-2D, sulfonated 758706-35-3D, sulfonated
(fuel cells containing polymer electrolyte materials with controlled nonfreezing water fraction for improved efficiency)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Dainippon Ink And Chemi | 1993 | | | JP 05-271460 A | HCA |
| Hatanaka, T | 2002 | 37 | 59 | R & D Review of Toyo | HCA |
| Nitto Denko Corp | 2001 | | | JP 2001294705 A | HCA |
| Nitto Denko Corp | 2001 | | | JP 2001294706 A | HCA |
| Sumitomo Chemical Co Lt | 1981 | | | JP 56-34329 B2 | HCA |
| Toa Nenryo Kogyo Kabush | 1989 | | | JP 64-22932 A | |
| Tonen Corp | 1996 | | | JP 08-180891 A | HCA |
| Toyota Central Research | 1998 | | | JP 10-340732 A | HCA |
| Toyota Central Research | 2002 | | | JP 2002324559 A | HCA |
| University Of Southern | 2001 | | | WO 2001504636 A | |
| University Of Southern | 2001 | | | US 6444343 B1 | HCA |
| University Of Southern | 2001 | | | WO 9822989 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | WO 0015691 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | WO 0119896 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | JP 2002524631 A | |
| Walker, M | 1999 | 74 | 67 | Journal of Applied P | HCA |

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (5 CITINGS)

L102 ANSWER 7 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:409513 HCA Full-text
TITLE: Synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications
AUTHOR(S): Dang, Thuy D.; Bai, Zongwu; Dalton, Matthew J.; Fossum, Eric
CORPORATE SOURCE: AFRL/MLBP, Materials and Manufacturing Directorate, Wright-Patterson Air Force Base, OH, 45433, USA
SOURCE: Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2004),

45(1), 22-23
CODEN: ACPPAY; ISSN: 0032-3934
PUBLISHER: American Chemical Society, Division of Polymer Chemistry
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English

AB The development of new polymer electrolyte membranes has been necessitated by the fact that com. Nafion membranes do not meet the requirements for high temperature (>120 °C) fuel cell operation. In this paper, the synthesis and characterization of highly sulfonated polyarylenethioethersulfone are described. The polymer backbone is wholly aromatic, bulky aromatic end-caps, and there is high sulfuric acid content to enhance water retention and potential applicability for high temperature (>120 °C) fuel cells applications. Proton conductivities, solubilities in water and various solvents, mol. weight, intrinsic viscosity, and film properties were measured of polymers in the salt and also acid form, both uncapped and capped. The proton conductivity of polymers is at least three times higher than that of the state-of-the-art Nafion-H proton exchange membrane under nearly comparable conditions, indicating that these polymers are promising candidates for PEMs in fuel cells.

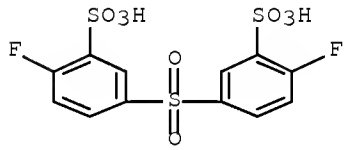
IT 689262-96-2DP, endcapped with phenyl-based monohalides
689263-01-2DP, reaction products with phenyl-based monohalides
(acid form; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

RN 689262-96-2 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

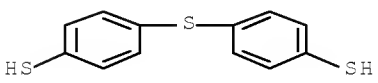
CRN 301155-59-9
CMF C12 H8 F2 O8 S3 . 2 Na



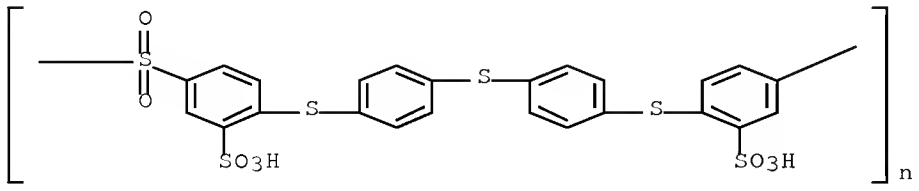
●2 Na

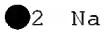
CM 2

CRN 19362-77-7
CMF C12 H10 S3



RN 689263-01-2 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene) sodium salt (1:2)] (CA INDEX NAME)

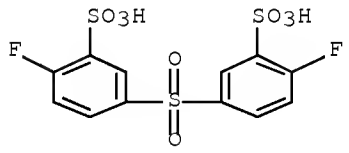


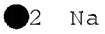


IT 689262-96-2P 689262-99-5DP, reaction products with phenyl-based monohalides 689263-01-2P
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
RN 689262-96-2 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

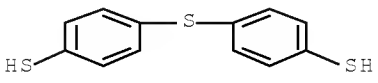
CRN 301155-59-9
CMF C12 H8 F2 O8 S3 . 2 Na





CM 2

CRN 19362-77-7
CMF C12 H10 S3

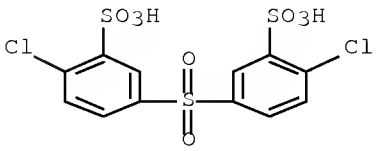


RN 689262-99-5 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

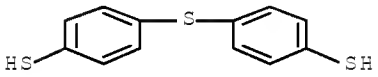
CRN 51698-33-0
CMF C12 H8 Cl2 O8 S3 . 2 Na



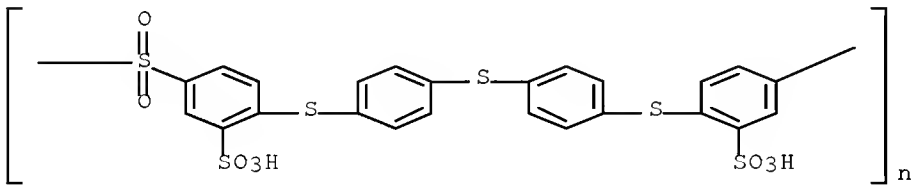
●2 Na

CM 2

CRN 19362-77-7
CMF C12 H10 S3

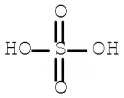


RN 689263-01-2 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene) sodium salt (1:2)] (CA INDEX NAME)



●2 Na

IT 7664-93-9, Sulfuric acid, reactions
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 76
ST sulfonated poly arylenethioether sulfone fuel cell separator proton cond
IT Membranes, nonbiological
(elec. conductive; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Fuel cell separators
(new materials for; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Polysulfones, preparation
(polyarylene-polyether-; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Polyethers, preparation
(polyarylene-polysulfone-; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Polythioethers
(polysulfone-, aromatic; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Polysulfones, preparation
(polythioether-, aromatic; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 689262-96-2DP, endcapped with phenyl-based monohalides 689263-01-2DP, reaction products with phenyl-based monohalides
(acid form; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 584-08-7, Potassium carbonate
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 126-33-0, Sulfolane
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 689262-96-2P 689262-99-5DP, reaction products with phenyl-based monohalides 689263-01-2P
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 64-19-7, Acetic acid, reactions 80-07-9, 4-Chlorophenyl sulfone 134-85-0, 4-Chlorobenzophenone 345-83-5, 4-Fluorobenzophenone 383-29-9, 4-Fluorophenyl sulfone 1310-73-2, Sodium hydroxide, reactions 7647-14-5, Sodium chloride, reactions 7664-93-9, Sulfuric acid, reactions 19362-77-7, 4,4'-Thiobisbenzenethiol

51698-33-0
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT 301155-59-9P
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Dang, T | 2003 | 89 | 508 | ACS National Meeting | HCA |
| Dimitrova, P | 2002 | 150 | 115 | Solid State Ionics | HCA |
| Matsumura, S | 2001 | 34 | 2848 | Macromolecules | HCA |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Schechter, A | 2002 | 147 | 1815 | Solid State Ionics | |
| Wainright, J | 1995 | 142 | L121 | J Electrochem Soc | HCA |
| Wang, F | 2002 | 197 | 231 | Journal of Membrane | HCA |
| Wang, J | 1996 | 41 | 193 | Electrochimica Acta | HCA |
| Wiles, K | 2002 | 43 | 993 | ACS National Meeting | HCA |
| Zawodzinski, T | 1991 | 95 | 6040 | Phys Chem | HCA |

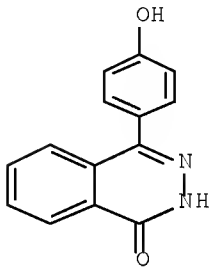
OS.CITING REF COUNT: 9 THERE ARE 9 CAPLUS RECORDS THAT CITE THIS RECORD (9 CITINGS)

L102 ANSWER 8 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:149010 HCA Full-text
TITLE: Sulfonation of poly(phthalazinones) with fuming sulfuric acid mixtures for proton exchange membrane materials
AUTHOR(S): Gao, Yan; Robertson, Gilles P.; Guiver, Michael D.; Jian, Xigao; Mikhailenko, Serguei D.; Wang, Keping; Kaliaguine, Serge
CORPORATE SOURCE: Institute for Chemical Process and Environmental Technology, National Research Council, Ottawa, ON, K1A 0R6, Can.
SOURCE: Journal of Membrane Science (2003), 227(1-2), 39-50
CODEN: JMESDO; ISSN: 0376-7388
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB As a novel class of proton exchange membrane (PEM) materials for use in fuel cells, sulfonated poly(phthalazinones) (SPPs), including sulfonated poly(phthalazinone ether sulfones) (SPPESs), sulfonated poly(phthalazinone ether ketones) (SPPEKs) and sulfonated poly(phthalazinone ether sulfone ketones) (SPPESKs), were prepared by modification of corresponding poly(phthalazinones) (PPs). Sulfonation reactions were conducted at room temperature using mixts. of 95-98% concentrated sulfuric acid and 27-33% fuming sulfuric acid with different acid ratios to get SPPs with degree of sulfonation (DS) in the desired range of 1.00-1.37. The presence of sulfonic acid groups in SPPs was confirmed by FTIR anal., and the DS and structures were characterized by NMR. The introduction of sulfonic groups into the polymer chains decreased the decomposition temperature Membrane films were cast from SPPs solution in N,N-dimethylacetamide (DMAc). Water uptakes and swelling ratios of SPPs membrane films increased with DS and temperature Proton conductivities of all SPPs increased with DS and temperature, reaching >10-2 S cm-1 at around DS 1.0.

IT 212967-53-8P
(PPEK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
RN 212967-53-8 HCA
CN 1(2H)-Phthalazinone, 4-(4-hydroxyphenyl)-, polymer with 1,4-benzenediol and bis(4-fluorophenyl)methanone (CA INDEX NAME)

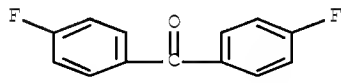
CM 1

CRN 152594-70-2
CMF C14 H10 N2 O2



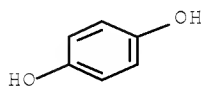

CM 2

CRN 345-92-6
CMF C13 H8 F2 O




CM 3

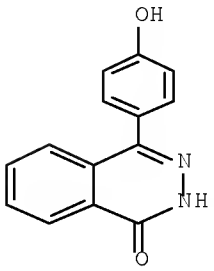
CRN 123-31-9
CMF C6 H6 O2




IT 212967-53-8DP, sulfonated
(SPPEK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
RN 212967-53-8 HCA
CN 1(2H)-Phthalazinone, 4-(4-hydroxyphenyl)-, polymer with 1,4-benzenediol and bis(4-fluorophenyl)methanone (CA INDEX NAME)

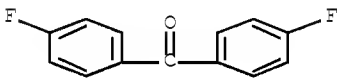
CM 1

CRN 152594-70-2
CMF C14 H10 N2 O2



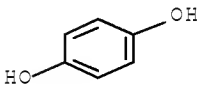

CM 2

CRN 345-92-6
CMF C13 H8 F2 O




CM 3

CRN 123-31-9
CMF C6 H6 O2




CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 76
ST sulfonation poly phthalazinone fuming sulfuric acid proton exchange membrane; fuel cell separator
polysulfone ether ketone phthalazinone swelling cond
IT Membranes, nonbiological
(elec. conductive; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT Solubility
(in various solvents; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT Polysulfones, preparation

(polyether-, ketone group-containing, aryl-, phthalazinones; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polysulfones, preparation
(polyether-, phthalazinones; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyketones
(polyether-, poly(phthalazinone ether ketone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyketones
(polyether-, sulfonated, poly(phthalazinone ether ketone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyethers, preparation
(polyketone-, poly(phthalazinone ether ketone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyethers, preparation
(polyketone-, sulfonated, poly(phthalazinone ether ketone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polysulfones, preparation
(polyoxyarylene-, sulfonated, poly(phthalazinone ether sulfone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyethers, preparation
(polysulfone-, ketone group-containing, aryl-, phthalazinones; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyethers, preparation
(polysulfone-, phthalazinones; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polyoxyarylenes
(polysulfone-, sulfonated, poly(phthalazinone ether sulfone); sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Ionic conductivity
(proton; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Polysulfones, preparation
(sulfonated, polyaryl ether ketone-; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT Decomposition
Fuel cell separators
Fuel cells
Sulfonation
Swelling, physical
(sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT 172402-80-1P
(PEESK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT 212967-53-8P
(PPEK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

IT 166894-40-2P
(PPES; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 172402-80-1DP, sulfonated
(SPEESK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 212967-53-8DP, sulfonated
(SPPEK; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 166894-40-2DP, sulfonated
(SPPES; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 7732-18-5, Water, processes
(absorption of; sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 67-66-3, Chloroform, processes 67-68-5, Dimethylsulfoxide, processes 68-12-2, Dimethyl formamide, processes 75-09-2, Dichloromethane, processes 109-99-9, Tetrahydrofuran, processes 127-19-5, Dimethyl acetamide 872-50-4, N-Methylpyrrolidone, processes
(sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)
IT 8014-95-7, Fuming sulfuric acid
(sulfonation of poly(phthalazinones) with fuming sulfuric acid mixts. for proton exchange membrane materials)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Dai, Y | 2001 | 79 | 1685 | J Appl Polym Sci | HCA |
| Dai, Y | 2002 | 207 | 189 | J Membr Sci | HCA |
| Faure, S | 1997 | | 818 | Proceedings of the S | HCA |
| Gao, Y | 2003 | 41 | 2731 | J Polym Sci A: Polym | HCA |
| Gao, Y | 2003 | 41 | 497 | J Polym Sci A: Polym | HCA |
| Genies, C | 2001 | 42 | 359 | Polymer | HCA |
| Glipa, X | 1997 | 97 | 323 | Solid State Ionics | HCA |
| Helmer-Metzmann, F | 1995 | | | US 5438082 | HCA |
| Huang, R | 2001 | 82 | 2651 | J Appl Polym Sci | HCA |
| Jian, X | 1993 | | | CN 931091799 | |
| Jian, X | 1993 | | | CN 931091802 | |
| Jones, D | 2001 | 185 | 41 | J Membr Sci | HCA |
| Kerres, J | 1996 | 34 | 2421 | J Polym Sci A: Polym | HCA |
| Kobayashi, T | 1998 | 106 | 219 | Solid State Ionics | HCA |
| Meng, Y | 1998 | 68 | 137 | J Appl Polym Sci | HCA |
| Meng, Y | 1999 | 37 | 1781 | J Polym Sci A: Polym | HCA |
| Miyatake, K | 2001 | 39 | 3211 | J Polym Sci A: Polym | HCA |
| Nolte, R | 1993 | 83 | 211 | J Membr Sci | HCA |
| Nunes, S | 2002 | 203 | 215 | J Membr Sci | HCA |
| Soczka-Guth, T | 1999 | | | WO 9929763 | HCA |
| Ueda, M | 1993 | 31 | 853 | J Appl Polym Sci | HCA |
| Wang, F | 2002 | 197 | 231 | J Membr Sci | HCA |
| Wilhelm, F | 2002 | 199 | 167 | J Membr Sci | HCA |
| Yen, S | 1998 | | | US 5769496 | |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |

OS.CITING REF COUNT: 51 THERE ARE 51 CAPLUS RECORDS THAT CITE THIS RECORD (51 CITINGS)

L102 ANSWER 9 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 139:367516 HCA Full-text
TITLE: Varnish composition for fuel cell electrodes.
INVENTOR(S): Higami, Makoto; Goto, Kohei; Kanaoka, Osayuki; Takahashi, Ryoichiro; Asano, Yoichi; Kakutani, Osamu; Okiyama, Hajime
PATENT ASSIGNEE(S): JSR Ltd., Japan; Honda Motor Co., Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 3
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2003317749 | A | 20031107 | JP 2002-122822 | 200204 24 |
| | | | <-- | |
| JP 3994024 | B2 | 20071017 | | |
| DE 10318398 | A1 | 20031204 | DE 2003-10318398 | 200304 23 |
| | | | <-- | |
| DE 10318398 | B4 | 20080521 | | |
| US 20040028806 | A1 | 20040212 | US 2003-420968 | 200304 23 |
| | | | <-- | |
| US 20060269655 | A1 | 20061130 | US 2006-498173 | 200608 03 |
| | | | <-- | |

PRIORITY APPLN. INFO.:
JP 2002-122822 A 200204 24
<--
JP 2002-122823 A 200204 24
<--
JP 2002-122824 A 200204 24
<--
US 2003-420968 A3 200304 23
<--

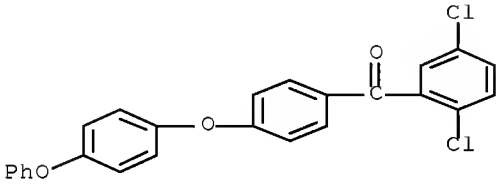
AB The disclosed varnish composition comprises sulfonated polymer, water, an organic solvent which is as good solvent for the polymer, and another solvent whose b. p. is ≥ 50° but lower than that of the good solvent. The varnish composition gives uniform proton-conductive membranes on the fuel cell electrodes.

IT 463963-71-5D, sulfonated
(mixed solvents for sulfonated polymer varnish for

fuel cell proton-conductive membranes
)
RN 463963-71-5 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

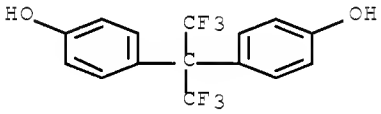
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



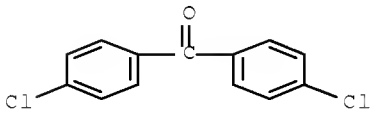
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IPCI H01M0008-02 [I,A]; H01M0008-10 [I,A]; C09D0171-00 [N,A]
IPCR H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]; C09D0171-00 [N,C]; C09D0171-00 [N,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 42
ST solvent mixt sulfonated polymer varnish fuel cell electrode
IT Varnishes

(for formation of sulfonated polymer type proton conductive membranes for fuel cells)
IT Solvents
(for varnishes for forming proton-conductive membranes on fuel cell electrode)
IT Fuel cell electrodes
(solvent mixture for varnishes for forming proton-conductive membranes on)
IT 78-93-3, Methyl ethyl ketone, uses 109-99-9, Tetrahydrofuran, uses 110-71-4 872-50-4, N-Methyl-2-pyrrolidone, uses 7732-18-5, Water, uses
(mixed solvents for sulfonated polymer varnish for fuel cell proton-conductive membranes)
IT 463963-71-5D, sulfonated
(mixed solvents for sulfonated polymer varnish for fuel cell proton-conductive membranes
)

L102 ANSWER 10 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 139:215541 HCA Full-text
TITLE: Procedure for the production of composite membranes from branched polyalkoxysiloxanes
INVENTOR(S): Cui, Wei; Goedel, Werner A.; Jaumann, Manfred; Moeller, Martin; Muzzafarow, Assiz
PATENT ASSIGNEE(S): DaimlerChrysler AG, Germany
SOURCE: Ger. Offen., 24 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| DE 10207411 | A1 | 20030904 | DE 2002-10207411 <-- | 20020221 |
| EP 1348478 | A2 | 20031001 | EP 2003-3310 <-- | 20030213 |
| EP 1348478 | A3 | 20050622 | | |
| EP 1348478 | B1 | 20090506 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK | | | | |
| JP 2003288917 | A | 20031010 | JP 2003-42899 <-- | 20030220 |
| US 20040062966 | A1 | 20040401 | US 2003-371451 <-- | 20030220 |
| US 6953634 | B2 | 20051011 | | |
| PRIORITY APPLN. INFO.: | | | DE 2002-10207411 A | 20020221 |

21

<--

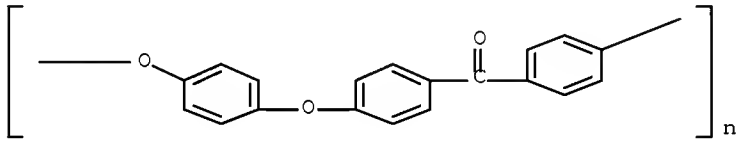
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The mech. strength of composite membranes based on organic polymer proton conductors is increased and the water swelling decreased by blending the proton conductors with branched polyalkoxysiloxanes such as tetraethoxysilane homopolymer.

IT 31694-16-3D, Victrex 450PF, sulfonated
(proton conductor; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IPCI C08J0005-18 [ICM,7]; C08L0083-12 [ICS,7]; C08L0083-00 [ICS,7,C*]; C08K0007-16 [ICS,7]; C08K0007-00 [ICS,7,C*]; H01M0008-02 [ICS,7]

IPCR B01D0069-00 [I,C*]; B01D0069-14 [I,A]; B01D0071-00 [I,C*]; B01D0071-00 [I,A]; B01D0071-52 [I,A]; B01D0071-70 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01B0013-00 [I,C*]; H01B0013-00 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST polymer proton exchange composite membrane branched polyalkoxysiloxane strength enhancer; tetraethoxysilane homopolymer reinforcing agent polymer proton exchange composite membrane

IT Polysiloxanes, uses
(alkoxy, branched; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

IT Polyketones
(polyether-, sulfonated, proton conductor; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

IT Polyethers, uses
(polyketone-, sulfonated, proton conductor; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

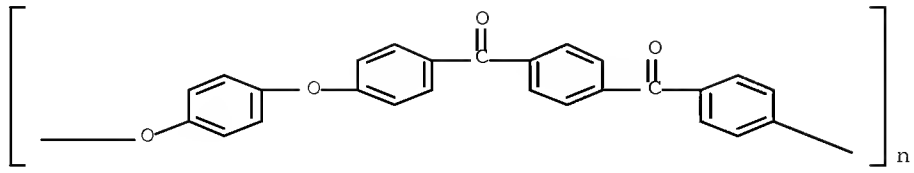
IT Fuel cell separators
(proton exchange, composite; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

IT 53201-03-9P, Sodium triethoxysilanolate
(monomer precursor; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

IT 27491-84-5P, Triethoxysilanol
(monomer; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)

IT 204921-13-1P, Triethoxysilanol homopolymer
(production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)
IT 11099-06-2P, Tetraethoxysilane homopolymer
(production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)
IT 31694-16-3D, Victrex 450PF, sulfonated
(proton conductor; production of proton exchange polymer composite membranes from branched polyalkoxysiloxanes for fuel cells)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (6 CITINGS)

L102 ANSWER 11 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 138:173274 HCA Full-text
TITLE: Proton conducting polymer membranes for fuel cell applications - characterization of hydrated and development of an hydrous materials
AUTHOR(S): Ise, M.; Schuster, M.; Meyer, W.; Schuster, M.; Kreuer, K. D.; Maier, J.
CORPORATE SOURCE: Siemens AG, ZT EN 1, Erlangen, 91052, Germany
SOURCE: GDCh-Monographie (2000), 21(Elektrochemische Verfahren fuer Neue Technologien), 239-247
CODEN: GDCHAI
PUBLISHER: Gesellschaft Deutscher Chemiker
DOCUMENT TYPE: Journal
LANGUAGE: German
AB For the hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK, the transport properties for protons and water (proton conductivity, electro-osmotic drag coefficient, water self-diffusion and water permeability) were determined exptl., for the anal. of the microstructure SAXS measurements were performed. For the same water content, the transport coeffs. are always higher in Nafion than in sulfonated PEEKK membranes which show less hydrophilic-hydrophobic separation Channel lattice models for the microstructure and the dependence of the proton conductivity on the space charge distribution of the protonic charge carriers are discussed comparatively for both membranes. As a first step in the development of monomer-free membranes for operating temps. higher than 100°C, ethylene oxide oligomers with two imidazole end groups have been synthesized which show, after mixing with trifluoromethane sulfonic acid, a structure diffusion of protonic charge carriers much faster than the self diffusion of the involved mols.
IT 60015-03-4D, PEEKK, sulfonated
(proton conductivity, electro-osmotic drag coefficient, water self-diffusion,
and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)
RN 60015-03-4 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST Nafion proton coducting polymer membrane fuel cell; fluorinated sulfonated hydrogenated polyoxyalkylene membrane fuel cell; imidazole ethylene oxide polymer membrane fuel cell
IT Polymer chains
(flexible; preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-containing, ionomers; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)
IT Diffusion
(hydrogen; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)
IT Functional groups
(imidazolyl; preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-containing, ionomers; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-containing; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)
IT Hydrogen bond
Proton transfer
Solvation
(preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)
IT Conducting polymers
Electroosmosis
Fuel cell separators
Microstructure
Permeability
(proton conductivity, electro-osmotic drag coefficient, water self-

diffusion,
and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)

IT Ionic conductivity
(proton; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)

IT Diffusion
(self-; preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)

IT 1333-74-0, Hydrogen, processes
(diffusion; proton conductivity, electro-osmotic drag coefficient, water self-diffusion, and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)

IT 496908-58-8P
(preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)

IT 75-21-8, Ethylene oxide, reactions 288-32-4, Imidazole, reactions
(preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)

IT 60015-03-4D, PEEKK, sulfonated 66796-30-3D, Nafion 117, hydrated
(proton conductivity, electro-osmotic drag coefficient, water self-diffusion,
and water permeability of hydrated polymer electrolyte membranes Nafion 117 and 65% sulfonated PEEKK for fuel cells)

IT 1493-13-6, Trifluoromethane sulfonic acid
(self-diffusion in; preparation and characterization of monomer-free polymer membranes of ethylene oxide oligomers with two imidazole groups for fuel cells)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Anon | | | | http://www.acdlabs.c | |
| Doyle, M | 2000 | 147 | 34 | J Electrochem Soc | HCA |
| Gebel, G | 1997 | 30 | 7914 | Macromolecules | HCA |
| Ise, M | 2000 | | | Dissertation Univers | |
| Ise, M | 1999 | | | Hasylab Annual Repor | |
| Ise, M | 1999 | 125 | 213 | Solid State Ionics | HCA |
| Kerres, J | 1999 | 125 | 243 | Solid State Ionics | HCA |
| Kreuer, K | 1998 | 43 | 1281 | Electrochim Acta | HCA |
| Kreuer, K | | | | J Membrane Science | |
| Kreuer, K | 1997 | 97 | 1 | Solid State Ionics | HCA |
| Muench, W | | 10 | | Proc SSPC | |
| Paddison, S | 2000 | 3 | 293 | J New Mat Electroche | |
| Savadogo, O | 1998 | 1 | 47 | J New Mater Electroc | HCA |
| Wainright, J | 1994 | 94 | 255 | Proc Electrochem Soc | |
| Zaidi, S | 2000 | 173 | 17 | J Membrane Science | HCA |

L102 ANSWER 12 OF 15 HCA COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 137:110259 HCA Full-text
TITLE: Ionic group-containing polymers and their polyelectrolyte moldings and membranes with good durability and processability
INVENTOR(S): Kitamura, Kota; Taguchi, Hiroaki; Sakaguchi, Yoshimitsu; Nakao, Junko
PATENT ASSIGNEE(S): Toyobo Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2002206024 | A | 20020726 | JP 2001-2664 <-- | 200101 10 |

PRIORITY APPLN. INFO.: JP 2001-2664 <-- 200101 10

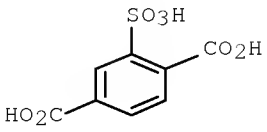
AB The polymers, useful as ion-exchange membranes for fuel cells, etc., show ionic group content ≥2.5 meq/g, logarithmic viscosity (at 25° in 0.05 dL/g methanesulfonic acid solution) ≥0.1 dL/g, weight loss after immersion in water at 25° ≤5%, solubility in dimethylsulfoxide at 40° ≥1%, and ion conductivity (at 80° and relative humidity 95%, and a.c. impedance 10,000 Hz) ≥0.3 S/cm. Thus, polymerization of 4,6-diaminoresorcinol dihydrochloride, monosodium 2,5-dicarboxybenzene sulfonate, and terephthalic acid gave a copolymer (logarithmic viscosity 2.13 dL/g, ionic group content 3.1 meq/g, weight loss 2.3%), which was dissolved in dimethylsulfoxide and cast on a glass plate to give a film with ion conductivity 0.75 S/cm.

IT 424821-44-3P, 4,6-Diaminoresorcinol dihydrochloride-monosodium 2,5-dicarboxybenzene sulfonate -terephthalic acid copolymer 442634-27-7P, 4,6-Diaminoresorcinol dihydrochloride-4,4'-Dicarboxydiphenyl sulfone-monosodium 2,5-dicarboxybenzene sulfonate copolymer
(ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)

RN 424821-44-3 HCA
CN 1,4-Benzenedicarboxylic acid, 2-sulfo-, monosodium salt, polymer with 1,4-benzenedicarboxylic acid and 4,6-diamino-1,3-benzenediol dihydrochloride (9CI) (CA INDEX NAME)

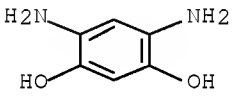
CM 1

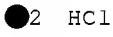
CRN 19089-60-2
CMF C8 H6 O7 S . Na



CM 2

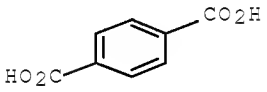
CRN 16523-31-2
CMF C6 H8 N2 O2 . 2 Cl H





CM 3

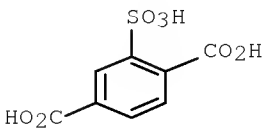
CRN 100-21-0
CMF C8 H6 O4



RN 442634-27-7 HCA
CN 1,4-Benzenedicarboxylic acid, 2-sulfo-, monosodium salt, polymer with 4,6-diamino-1,3-benzenediol dihydrochloride and 4,4'-sulfonylbis[benzoic acid] (9CI) (CA INDEX NAME)

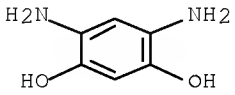
CM 1

CRN 19089-60-2
CMF C8 H6 O7 S . Na



CM 2

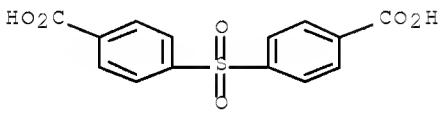
CRN 16523-31-2
CMF C6 H8 N2 O2 . 2 Cl H



●2 HCl

CM 3

CRN 2449-35-6
CMF C14 H10 O6 S



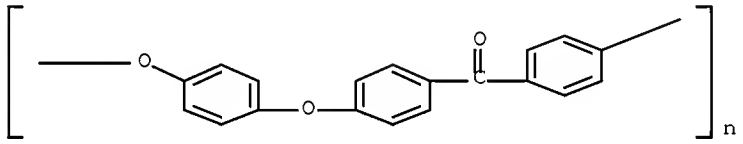
IPCI C08G0073-06 [ICM,7]; C08G0073-00 [ICM,7,C*]; C08G0075-32 [ICS,7]; C08G0075-00 [ICS,7,C*]; C08J0005-22 [ICS,7]; C08J0005-20 [ICS,7,C*]; H01M0008-02 [ICS,7]; C08L0079-04 [ICS,7]; C08L0079-00 [ICS,7,C*]; C08L0081-00 [ICS,7]
IPCR C08J0005-20 [I,C*]; C08J0005-22 [I,A]; C08G0073-00 [I,C*]; C08G0073-06 [I,A]; C08G0075-00 [I,C*]; C08G0075-32 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52
ST polyelectrolyte solid fuel cell ion exchanger polybenzoxazole; aminoresorcinol hydrochloride sodium carboxybenzene sulfonate terephthalic polymer; ionic conducting film polybenzoxazole polyelectrolyte
IT Films
(elec. conductive; ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Electric conductors
(films; ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Fuel cell electrolytes
Ion exchange membranes
(ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Polybenzoxazoles
(ionic group-containing polymers for polyelectrolyte moldings and

membranes with good durability and processability)
IT Molded plastics, uses
(ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Polysulfones, uses
(polybenzoxazole-; ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Polybenzoxazoles
(polysulfone-; ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT Polyelectrolytes
(solid; ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)
IT 424821-44-3P, 4,6-Diaminoresorcinol dihydrochloride-monosodium 2,5-dicarboxybenzene sulfonate -terephthalic acid copolymer 426255-56-3P 442634-26-6P 442634-27-7P, 4,6-Diaminoresorcinol dihydrochloride-4,4'-Dicarboxydiphenyl sulfone-monosodium 2,5-dicarboxybenzene sulfonate copolymer
(ionic group-containing polymers for polyelectrolyte moldings and membranes with good durability and processability)

L102 ANSWER 13 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 136:121088 HCA Full-text
TITLE: Electrolyte membrane-electrode laminate for solid polymer electrolyte fuel cell
INVENTOR(S): Fukuda, Kaoru; Asano, Yoichi; Kanaoka, Osayuki; Saito, Nobihiro; Nanaumi, Masaaki
PATENT ASSIGNEE(S): Honda Motor Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2002025581 | A | 20020125 | JP 2000-204131 | 200007 05 <-- |
| JP 3535455 | B2 | 20040607 | | |
| US 20020045081 | A1 | 20020418 | US 2001-897426 | 200107 03 <-- |
| CA 2352356 | A1 | 20020105 | CA 2001-2352356 | 200107 04 <-- |
| CA 2352356 | C | 20070220 | | |
| DE 10132434 | A1 | 20020508 | DE 2001-10132434 | 200107 04 <-- |

DE 10132434 B4 20071213
PRIORITY APPLN. INFO.: JP 2000-204131 A 200007 05
<--
JP 2000-256157 A 200008 25
<--
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT
AB The laminate has an electrolyte membrane held between a cathode and an anode, where the electrolyte membrane and the electrodes contain F-free soluble aromatic hydrocarbon polymer ion exchangers. The ion exchanger in the electrodes may have higher solubility than that in the electrolyte membrane.
IT 31694-16-3, Peek
(sulfonated; non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IPCI H01M0008-02 [ICM,7]; H01M0008-10 [ICS,7]; B01D0069-12 [ICS,7]; B01D0069-00 [ICS,7,C*]
IPCR B01D0069-00 [I,C*]; B01D0069-12 [I,A]; B01J0038-00 [I,C*]; B01J0038-00 [I,A]; B29B0017-02 [I,C*]; B29B0017-02 [I,A]; B29K0105-26 [N,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell polymer electrolyte electrode laminate ion exchanger
IT Fuel cells
(non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)
IT Polyimides, uses
(polyether-, sulfonated; non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)
IT Polyethers, uses
(polyimide-, sulfonated; non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)
IT Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
(sulfonated; non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)
IT 25212-74-2, Poly(phenylene sulfide) 25667-42-9 31694-16-3

, Peek
(sulfonated; non-fluoropolymer soluble ion exchangers in electrolyte membrane-electrode laminates for polymer electrolyte fuel cells)

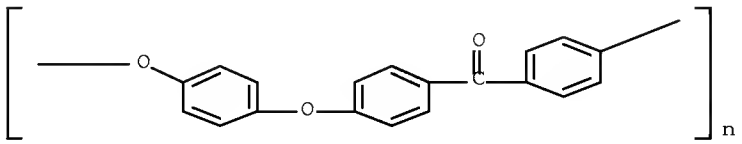
L102 ANSWER 14 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 133:137819 HCA Full-text
TITLE: Electrochemical characterisation of sulfonated polyetherketone membranes
AUTHOR(S): Bauer, B.; Jones, D. J.; Roziere, J.; Tchicaya, L.; Alberti, G.; Casciola, M.; Massinelli, L.; Peraio, A.; Besse, S.; Ramunni, E.
CORPORATE SOURCE: Gesellschaft fur funktionelle Membranen und Anlagentechnologie GmbH, St. Ingbert, 66386, Germany
SOURCE: Journal of New Materials for Electrochemical Systems (2000), 3(2), 93-98
CODEN: JMESFQ; ISSN: 1480-2422
PUBLISHER: Journal of New Materials for Electrochemical Systems
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The thermal, mech., and electrochem. characterization of sulfonated poly(ether ketone) membranes (PEEK-Ss), including fuel cell tests in hydrogen/oxygen and hydrogen/air, are described. In thermogravimetric anal., PEEK-S membranes lose water up to 150°, and degradation of the sulfonic acid groups takes place at .apprx.240°. Thermomech. anal. of a PEEK-S membrane of 60 μm thickness and equivalent weight 625 g/mol shows that the membrane undergoes a shrinkage of 1.5% up to 140°. Reversible elongation of 0.6% occurs thereafter up to 180°. The conductivity, measured by impedance spectroscopy, on non-reinforced and on woven polymer-reinforced PEEK-S, is reported as a function of temperature and of relative humidity (RH), and compared with that of Nafion-117. At 100° and 100% RH the conductivity of PEEK-S is 2-5.10-2 S/cm (depending on thermal history), increasing to 0.11 S/m at 150°. Polarization characteristics of a non-reinforced PEEK-S membrane of 18 μm thickness at temps. up to 110° under conditions of hydrogen/air and hydrogen/oxygen are compared. The results of fuel cell (H2-O2) tests on composite, reinforced membranes are reported.

IT 31694-16-3D, Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene), sulfonated
(thermal, mech., and electrochem. characterization of sulfonated poly(ether ketone) membranes in relation to fuel cell use)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

ST sulfonated polyether ketone membrane thermal mech electrochem property; heat resistance sulfonated PEEK

membrane fuel cell use; mech property
sulfonated PEEK membrane fuel cell
use; elec cond sulfonated PEEK membrane fuel
cell use

IT Polyketones
Polyketones
(polyether-, aromatic; thermal, mech., and electrochem.
characterization of sulfonated poly(ether ketone)
membranes in relation to fuel cell
use)

IT Polyethers, uses
Polyethers, uses
(polyketone-, aromatic; thermal, mech., and electrochem.
characterization of sulfonated poly(ether ketone)
membranes in relation to fuel cell
use)

IT Humidity
(relative; thermal, mech., and electrochem. characterization of
sulfonated poly(ether ketone) membranes in relation to
fuel cell use and)

IT Electric conductivity
Fuel cells
Heat-resistant materials
(thermal, mech., and electrochem. characterization of sulfonated
poly(ether ketone) membranes in relation to
fuel cell use)

IT Polymer degradation
(thermal; thermal, mech., and electrochem. characterization of
sulfonated poly(ether ketone) membranes in relation to
fuel cell use)

IT 1333-74-0, Hydrogen, properties
(-air,; polarization of sulfonated poly(ether ketone)
membranes in presence of hydrogen-air in relation to
fuel cell use)

IT 7782-44-7, Oxygen, properties
(hydrogen-; polarization of sulfonated poly(ether ketone)
membranes in presence of hydrogen-oxygen in relation to
fuel cell use)

IT 31694-16-3D, Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-
1,4-phenylene), sulfonated
(thermal, mech., and electrochem. characterization of
sulfonated poly(ether ketone) membranes in
relation to fuel cell use)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Bailly, C | 1987 | 28 | 1009 | Polymer | HCA |
| Buchi, F | 1995 | 40 | 345 | Electrochimica Acta | HCA |
| Faure, S | | | | FR 9605707 | |
| Flint, S | 1997 | 97 | 299 | Solid State Ionics | HCA |
| Glipa, X | 1997 | 97 | 323 | Solid State Ionics | HCA |
| Gupta, B | 1994 | 48 | 127 | Chimia | HCA |
| Helmer-Metzmann, F | 1993 | | | EP 0574791 A2 | HCA |
| Jin, X | 1985 | 17 | 4 | Br Polymer J | HCA |
| Jones, D | 1996 | 1-2 | 115 | Envt Res Forum | HCA |
| Kabayashi, T | 1998 | 106 | 219 | Solid State Ionics | |
| Kolde, J | 1995 | 95-23 | 193 | The Electrochemical | HCA |

| | | | | | |
|---|---|---|---|---|---|
| Kreuer, K | 1995 | 95 | 241 | Proc Electrochem Soc | |
| Linkous, C | 1998 | 23 | 525 | Int J Hydrogen Energ | HCA |
| Nolte, R | 1993 | 83 | 211 | J Membrane Sci | HCA |
| Ostrovskii, D | 1997 | 97 | 315 | Solid State Ionics | HCA |
| Savadogo, O | 1998 | 1 | 47 | J New Mat Electroche | HCA |
| Steck, A | 1997 | | 792 | Proceedings of the S | HCA |

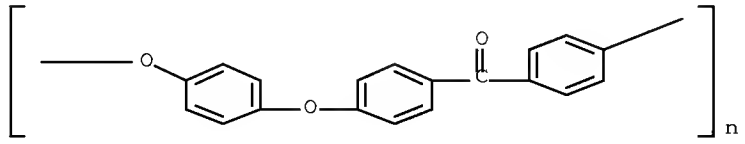
OS.CITING REF COUNT: 101 THERE ARE 101 CAPLUS RECORDS THAT CITE THIS RECORD (102 CITINGS)

L102 ANSWER 15 OF 15 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 130:82473 HCA Full-text
TITLE: Development and characterization of ion-exchange polymer blend membranes
AUTHOR(S): Cui, W.; Kerres, J.; Eigenberger, G.
CORPORATE SOURCE: Institut fur Chemische Verfahrenstechnik, Universitat Stuttgart, Stuttgart, D-70199, Germany
SOURCE: Separation and Purification Technology (1998), 14(1-3), 145-154
CODEN: SPUTFP; ISSN: 1383-5866
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In the presented paper, the preparation and characterization of new ionomer blend membranes containing sulfonated poly(ether ether ketone) PEEK Victrex is described. The second blend components were Polysulfone Udel-ortho-sulfone-diamine, polyamide PA Trogamid P (producer: Hulls) and poly(ether imide) PEI Ultem (producer: General Elec.). In the blend membranes swelling was reduced by specific interaction, in the case of the blend components PA and PEI hydrogen bonds, and in the case of the blend component PS-U-NH2 (partial) poly salt formation, leading to electrostatic interaction between the blend component macromols., and hydrogen bonds. The acid-base interactions also led to decrease of ionic conductivity by partial blocking of SO3- groups for cation transport, compared with the ionic conductivity of the hydrogen bond blends. The acid-base blends showed better ion permselectivities than the hydrogen bond blends, even at high electrolyte concns., and thus better performance in electrodialysis. The thermal stability of the investigated blends was very good and in the case of the acid-base blends even better than the thermal stability of pure PEEK-SO3H. DSC traces of the blend membranes showed only one Tg. In addition, the membranes are transparent to visible light. But therefrom it cannot be concluded that the blend components are miscible to the mol. level: at the acid-base blends, the Tg of PEEK-SO3H is very similar to the Tg of PS-U-NH2, and in the investigated hydrogen bond blends, the portion of PA or PEI, resp., might be too low to be detected by DSC. The investigated blend membranes showed similar performance as the com. cation-exchange membrane C MX in electrodialysis (ED) application. The performance of the acid-base blend membrane is better than the performance of the hydrogen bonded PEEK-PA blend, especially in the ED experiment applying the higher NaCl concentration This is mainly due to the lower swelling and thus better ion permselectivity of the acid-base blend membrane, compared with the PEEK-PA blend. To get a deeper insight into the microphase structure of the investigated blends, dynamic mech. analyses and TEM investigations of the prepared blend membranes are planned. In addition, due to their promising properties, the preparation of arylene main-chain acid-base blends with other polymeric acidic and basic components is planned. Furthermore, the acid-base blend membranes will be tested in H2 polymer electrolyte fuel cells and direct methanol fuel cells, because preliminary tests have shown that they have a good perspective in this application.

IT 31694-16-3D, PEEK, sulfonated
(Victrex; development and characterization of ion-exchange

polymer blend membranes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 38-3 (Plastics Fabrication and Uses)
ST ion exchange polymer blend membrane; sulfonated PEEK blend ion exchange membrane; polyether polyketone sulfonated blend ion exchange; polyimide polyether blend ion exchange; aminated polysulfone blend ion exchange
IT Cation exchange membranes
Electric resistance
Glass transition temperature
Ion exchange membranes
Swelling, physical
Thermal stability
(development and characterization of ion-exchange polymer blend membranes)
IT Ionomers
Polyamides, uses
Polymer blends
(development and characterization of ion-exchange polymer blend membranes)
IT Dialyzers
Dialyzers
(electrodialyzers, membranes; development and characterization of ion-exchange polymer blend membranes)
IT Polysulfones, uses
Polysulfones, uses
(polyether-, aminated; development and characterization of ion-exchange polymer blend membranes)
IT Polyketones
Polyketones
(polyether-, aromatic, sulfonated; development and characterization of ion-exchange polymer blend membranes)
IT Polyimides, uses
Polyimides, uses
(polyether-; development and characterization of ion-exchange polymer blend membranes)
IT Polyethers, uses
Polyethers, uses
(polyimide-; development and characterization of ion-exchange polymer blend membranes)
IT Polyethers, uses
Polyethers, uses
(polyketone-, aromatic, sulfonated; development and characterization of ion-exchange polymer blend membranes)
IT Polyethers, uses
Polyethers, uses
(polysulfone-, aminated; development and characterization of

ion-exchange polymer blend membranes)
IT Permeability
(selective, ionic; development and characterization of ion-exchange polymer blend membranes)
IT 25054-12-0, Nylon 6-3-T
(Trogamid P; development and characterization of ion-exchange polymer blend membranes)
IT 31694-16-3D, PEEK, sulfonated
(Victrex; development and characterization of ion-exchange polymer blend membranes)
IT 25135-51-7D, Udel P 3500, aminated 25154-01-2D, 4,4'-Dichlorodiphenylsulfone-diphenylolpropane copolymer, aminated 61128-24-3, Ultem 61128-46-9
(development and characterization of ion-exchange polymer blend membranes)
IT 7647-14-5, Sodium chloride, uses
(permselectivity of; development and characterization of ion-exchange polymer blend membranes)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Anon | 1992 | A21 | | Ulmann's Encyclopedi | |
| Eisenbach, C | 1995 | 36 | 795 | ACS Polym Prepr Div | HCA |
| Eisenbach, C | 1994 | 15 | 117 | Macromol Rapid Commu | HCA |
| Guiver, M | 1995 | 28 | 7612 | Macromolecules | HCA |
| Helmer-Metzmann, F | 1993 | | | EP 0574791 | HCA |
| Katime, I | 1996 | 5 | 3097 | Polymeric Materials | |
| Kerres, J | | | | submitted to J Polym | |
| Kusomoto, K | 1976 | 8 | 225 | Polym J | |
| McRae, W | 1960 | | | US 2962454 | HCA |
| Nolte, R | 1993 | 83 | 211 | J Membr Sci | HCA |
| Smith, P | 1983 | 21 | 223 | J Polym Sci: Polym L | HCA |

OS.CITING REF COUNT: 92 THERE ARE 92 CAPLUS RECORDS THAT CITE THIS RECORD (92 CITINGS)

----------(UNIQUE MOIETIES OF CLAIM 4)----------

=> D L94 1-11 IBIB ABS HITSTR HITIND RETABLE

L94 ANSWER 1 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 145:86542 HCA Full-text
TITLE: Branched and sulfonated multi block copolymer and electrolyte membrane using the same
INVENTOR(S): Shin, Chong-Kyu; Tae, Young-Ji; Chang, Jae-Hyuk; Lee, Bong-Keun; Cho, Chang-Ae; Lee, Sang-Hyun; Yoo, Hwang-Chan; Moon, Go-Young
PATENT ASSIGNEE(S): Lg Chem, Ltd., S. Korea
SOURCE: U.S. Pat. Appl. Publ., 17 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| US 20060134494 | A1 | 20060622 | US 2005-282488 | 200511 21 <-- |
| US 7807759 | B2 | 20101005 | | |
| KR 2006071690 | A | 20060627 | KR 2004-110487 | 200412 22 <-- |
| TW 294889 | B | 20080321 | TW 2005-138560 | 200511 03 <-- |
| CA 2549841 | A1 | 20060622 | CA 2005-2549841 | 200511 22 <-- |
| CA 2549841 | C | 20100126 | | |
| WO 2006068369 | A1 | 20060629 | WO 2005-KR3939 | 200511 22 <-- |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

| | | | | |
|---|---|---|---|---|
| CN 1898293 | A | 20070117 | CN 2005-80001135 | 200511 22 <-- |
| CN 100556931 | C | 20091104 | | |
| JP 2007523230 | T | 20070816 | JP 2006-550969 | 200511 22 <-- |
| EP 1828278 | A1 | 20070905 | EP 2005-821386 | 200511 22 <-- |

R: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LI, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR

| | | | | |
|---|---|---|---|---|
| IN 2006DN01527 | A | 20070810 | IN 2006-DN1527 | 200603 22 <-- |
| PRIORITY APPLN. INFO.: | | | KR 2004-110487 A | 200412 22 <-- |

WO 2005-KR3939 W
200511
22

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The present invention relates to a branched and sulfonated multiblock copolymer and an electrolyte membrane produced therefrom. The copolymer has a high level of proton conductivity and excellent mech. properties, is chemical stable and can be readily used to produce a branched and sulfonated multiblock copolymer thin-film electrolyte membrane for use in a fuel cell. The copolymer can be effectively used for the production of a thin film without a decrease in membrane properties according to the increase in sulfonic acid groups since it enables the regulation of the distribution, the location and the number of sulfonic acid groups in the polymer backbone.

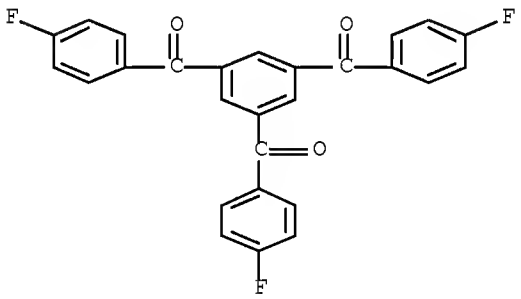
IT 893445-20-0P
(branched and sulfonated multiblock copolymer for electrolyte membrane)

RN 893445-20-0 HCA

CN Benzenesulfonic acid, 2,5-dihydroxy-, potassium salt (1:1), polymer with 1,3,5-benzenetriyltris[(4-fluorophenyl)methanone], bis(4-fluorophenyl)methanone and 4,4'-(9H-fluoren-9-ylidene)bis[phenol], block (CA INDEX NAME)

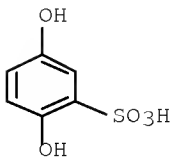
CM 1

CRN 267668-44-0
CMF C27 H15 F3 O3



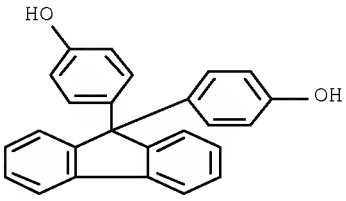
CM 2

CRN 21799-87-1
CMF C6 H6 O5 S . K



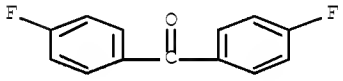
CM 3

CRN 3236-71-3
CMF C25 H18 O2




CM 4

CRN 345-92-6
CMF C13 H8 F2 O




INCL 429033000; 521025000
IPCI H01M0008-10 [I,A]; C08J0005-20 [I,A]; C08J0005-22 [I,A]; H01M0008-10 [I,A]; C08G0065-40 [I,A]; C08G0075-24 [I,A]; C08G0075-00 [I,C*]; C08G0065-38 [I,A]; C08G0065-00 [I,C*]; C08L0081-08 [I,A]; C08L0081-00 [I,C*]
IPCR H01M0008-10 [I,A]; C08J0005-20 [I,C]; C08J0005-20 [I,A]; H01M0008-10 [I,C]
NCL 429/494.000; 429/506.000; 429/535.000; 521/025.000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell electrolyte membrane
branched sulfonated multiblock copolymer
IT Fuel cell electrolytes
(branched and sulfonated multiblock copolymer for electrolyte membrane)
IT Polymers
(branched; branched and sulfonated multiblock copolymer for electrolyte membrane)
IT Fuel cells
(direct methanol; branched and sulfonated multiblock copolymer for electrolyte membrane)
IT Polyketones
(polyether-, cardo; branched and sulfonated multiblock copolymer for electrolyte membrane)
IT Cardo polymers
(polyether-polyketones; branched and sulfonated multiblock copolymer for electrolyte membrane)
IT Polyethers

(polyketone-, cardo; branched and sulfonated multiblock copolymer for electrolyte membrane)
IT 893445-20-0P
(branched and sulfonated multiblock copolymer for electrolyte membrane)
IT 67-56-1, Methanol, uses
(branched and sulfonated multiblock copolymer for electrolyte membrane)
IT 267668-44-0P 893445-19-7P
(branched and sulfonated multiblock copolymer for electrolyte membrane)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

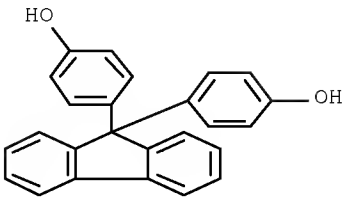
L94 ANSWER 2 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:216069 HCA Full-text
TITLE: Sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity
INVENTOR(S): Kawakami, Tomonori; Izuhara, Daisuke; Shimoyama, Naoki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 23 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2006049303 | A | 20060216 | JP 2005-195840 <-- | 20050705 |
| PRIORITY APPLN. INFO.: | | | JP 2004-197666 <-- | A 20040705 |

AB The membranes, useful for polymer electrolyte fuel cells (PEFC), comprise sulfonated (hydrocarbon) polymers with volume d. of sulfonic acid groups in wet membranes (Sw) 1.45-6.0 mmol/cm3 (definition is described).
IT 116875-10-6DP, sulfonated
(sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
RN 116875-10-6 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

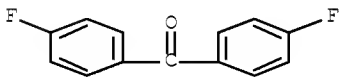
CM 1

CRN 3236-71-3
CMF C25 H18 O2



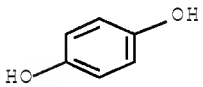
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

CRN 123-31-9
CMF C6 H6 O2



IPCI H01M0008-02 [I,A]; C08J0005-22 [I,A]; C08J0005-20 [I,C*];
H01B0001-06 [I,A]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST polyoxyphenylene sulfonic acid density fuel cell
electrolyte; sulfonated cardo fluoropolymer polyether polyketone
electrolyte; PEFC sulfonated electrolyte water methanol resistance
IT Polyketones
(polyether-, cardo, sulfonated; sulfonated polymer-based
electrolyte membranes with good water/methanol
resistance and high proton conductivity for fuel cells
)
IT Polyketones
(polyether-, fluorine-containing, cardo, sulfonated; sulfonated
polymer-based electrolyte membranes with good
water/methanol resistance and high proton conductivity for fuel
cells)
IT Polyketones
(polyether-, fluorine-containing, sulfo-containing; sulfonated
polymer-based electrolyte membranes with good
water/methanol resistance and high proton conductivity for fuel
cells)

IT Polyketones
(polyether-, sulfo-containing; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Fluoropolymers, uses
(polyether-polyketone-, cardo, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Fluoropolymers, uses
(polyether-polyketone-, sulfo-containing; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells
)
IT Cardo polymers
(polyether-polyketones, fluorine-containing, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Cardo polymers
(polyether-polyketones, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells
)
IT Polyethers, uses
(polyketone-, cardo, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells
)
IT Polyethers, uses
(polyketone-, fluorine-containing, cardo, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Polyethers, uses
(polyketone-, fluorine-containing, sulfo-containing; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Polyethers, uses
(polyketone-, sulfo-containing; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Hydrocarbons, uses
(polymers, sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Fuel cell electrolytes
(sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Silsesquioxanes
(sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT Polyoxyphenylenes
(sulfonated; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)
IT 25134-01-4DP, sulfonated

(assumed monomers; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)

IT 345-92-6, 4,4'-Difluorobenzophenone 2487-90-3, Trimethoxysilane 23523-56-0
(in preparation of monomers; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)

IT 210531-45-6P 875647-25-9P
(monomers; sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)

IT 24938-67-8DP, YPX 100L, sulfonated 116875-10-6DP, sulfonated 862772-94-9P 862773-04-4P 875647-26-0P 875647-27-1P 875647-28-2P
(sulfonated polymer-based electrolyte membranes with good water/methanol resistance and high proton conductivity for fuel cells)

L94 ANSWER 3 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:111309 HCA Full-text
TITLE: Electrode catalyst layer, anode, and membrane-electrode assembly for polymer electrolyte fuel cell
INVENTOR(S): Kono, Satoshi; Kitai, Masayuki; Ito, Nobuaki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 19 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2006012778 | A | 20060112 | JP 2005-87880 | 200503 25 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2004-151454 | A 200405 21 |
| | | | <-- | |

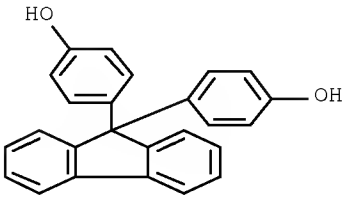
AB The catalyst- and polymer-containing layer for the cell using a liquid fuel, does not contain anionic group substantially. The anode is made of the above electrode catalyst layer. The assembly contain the layer and/or the anode. A fuel cell using a liquid fuel and the above assembly is also claimed. A portable apparatus or a vehicle using the cell as a driving source is also claimed. The cell has high durability and energy d.

IT 116875-10-6DP, sulfonated
(cardo, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

RN 116875-10-6 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

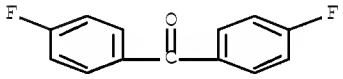
CM 1

CRN 3236-71-3
CMF C25 H18 O2



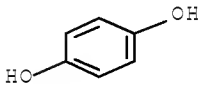

CM 2

CRN 345-92-6
CMF C13 H8 F2 O




CM 3

CRN 123-31-9
CMF C6 H6 O2




IPCI H01M0004-86 [I,A]; H01M0008-00 [I,A]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST anionic group free electrode catalyst layer anode fuel cell; membrane electrode assembly polymer electrolyte fuel cell; portable app polymer electrolyte fuel cell electrode catalyst layer; vehicle polymer electrolyte fuel cell electrode catalyst layer
IT Catalysts
Electric vehicles
Fuel cell anodes
(anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)
IT Fluoropolymers, uses

(anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polybenzimidazoles
Polycarbonates, uses
Polyimides, uses
Polyoxyphenylenes
Polysulfones, uses
Polythiophenylenes
(catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Fluoropolymers, uses
(fluoroalkoxy group-containing, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Perfluoro compounds
Vinyl compounds, uses
(perfluoroalkyl vinyl ether polymers, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Ethers, uses
(perfluoroalkyl vinyl, polymers, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyketones
(polyether-, cardo, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyketones
(polyether-, cardo, sulfonated, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyketones
(polyether-, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Cardo polymers
(polyether-polyketones, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Cardo polymers
(polyether-polyketones, sulfonated, catalyst layer containing; anionic group-free electrode catalyst layer for

anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyethers, uses
(polyketone-, cardo, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyethers, uses
(polyketone-, cardo, sulfonated, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polyethers, uses
(polyketone-, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Fuel cells
(polymer electrolyte; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polythioethers
(polysulfone-, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Polysulfones, uses
(polythioether-, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT Electric apparatus
(portable; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT 12779-05-4
(anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT 116875-10-6DP, sulfonated
(cardo, catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

IT 116-14-3D, Tetrafluoroethylene, polymers with perfluoroalkyl ethers 9002-84-0, Polytetrafluoroethylene 24937-79-9, Poly(vinylidene fluoride) 25120-07-4, Polyhexafluoropropylene 27028-97-3D, Poly(phenylene sulfide sulfone), sulfonated
(catalyst layer containing; anionic group-free electrode catalyst layer for anode and membrane-

electrode assembly in polymer electrolyte fuel cell for portable apparatus and vehicle)

L94 ANSWER 4 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:389781 HCA Full-text
TITLE: Solid polymer electrolyte membranes with low methanol permeability and high protonic conductivity
INVENTOR(S): Sakai, Nobuyuki
PATENT ASSIGNEE(S): Sumitomo Bakelite Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

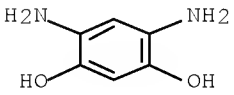
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005285449 | A | 20051013 | JP 2004-95586 | 200403 29 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2004-95586 | 200403 29 |
| | | | <-- | |

AB The electrolyte membranes, useful for fuel cells, are composed of polymers having ≥10 mol% mesogen- and ion-dissociative group-containing repeating units. The electrolyte membranes show low methanol permeability and high protonic conductivity

IT 866556-22-1DP, sulfonated
(solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
RN 866556-22-1 HCA
CN 2,6-Naphthalenedicarbonyl dichloride, polymer with 4,6-diamino-1,3-benzenediol dihydrochloride (9CI) (CA INDEX NAME)

CM 1

CRN 16523-31-2
CMF C6 H8 N2 O2 . 2 Cl H

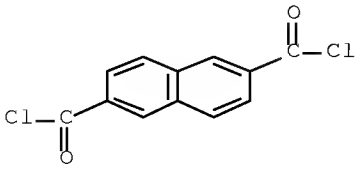



●2 HCl

CM 2

CRN 2351-36-2

CMF C12 H6 C12 O2



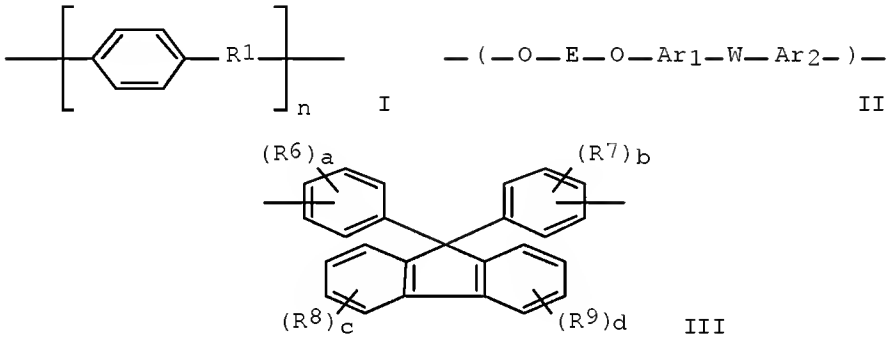
IPCI H01M0008-02 [ICM,7]; H01B0001-06 [ICS,7]; H01M0008-10 [ICS,7]
IPCR H01B0001-06 [I,A]; H01B0001-06 [I,C*]; H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-10 [I,A]; H01M0008-10 [I,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 76
ST solid polymer electrolyte membrane mesogen fuel cell; norbornene phenylstyrene polymer sulfonated electrolyte
IT Ionic conductors
(protonic; solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
IT Fuel cell electrolytes
Polyelectrolytes
Solid electrolytes
(solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
IT Polyolefins
(solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
IT Phenolic resins, uses
Polyimides, uses
(solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
IT Epoxy resins, uses
Polybenzoxazoles
(sulfonated; solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)
IT 209905-88-4DP, sulfonated 866556-21-0DP, sulfonated 866556-22-1DP, sulfonated 866556-23-2DP, sulfonated
(solid polymer electrolyte membranes composed of polymers having mesogen- and ion-dissociative group-containing repeating units)

L94 ANSWER 5 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:62658 HCA Full-text
TITLE: Polymer electrolyte membrane
INVENTOR(S): Kawakami, Tomonori; Izuhara, Daisuke; Shimoyama, Naoki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF

DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005158724 | A | 20050616 | JP 2004-320703 | 200411 04 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2003-375211 A | 200311 05 |
| | | | <-- | |

GI




AB The electrolyte membrane, for use in a fuel cell, is a sulfonated polymer containing 3.29-3.75 mmol sulfonic acid group/cm3 and a solubility parameter 9.00-12.18. Preferably, the polymer has repeating units I [1 = single bond, -O-, -S-, -CH2-, -CF2-, or -C(CF3)-; R2-5 = H, sulfonic acid group, ME, Et, Ph,Cyclohexyl, or fluoroalkyl group and contains ≥1 sulfonic acid group] or II [E = bivalent sulfonic acid group containing aromatic ring , Ar1 and Ar2 = (substituted) bivalent Arylene groups, W = -CO-, -SO2-, -P(R)O- (R = organic group); and II contains ≥2 of E, A1, A2, and/or W]. E is preferably III, where the dotted line may be a single bond or may not exist, and R6-9 = halogen, single valent organic group, or sulfonic acid group and contains ≥1 sulfonic acid group, a and b = 0-4, c and d = 0-5.

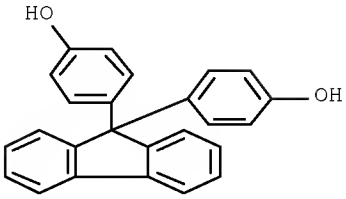
IT 116875-10-6DP, sulfonated
(in manufacture of sulfonated polymer electrolyte membranes for fuel cells)

RN 116875-10-6 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

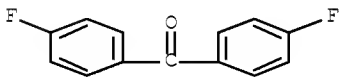
CM 1

CRN 3236-71-3
CMF C25 H18 O2



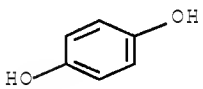
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

CRN 123-31-9
CMF C6 H6 O2



IPCI H01M0008-02 [ICM,7]; C08J0005-22 [ICS,7]; C08J0005-20 [ICS,7,C*];
H01B0001-06 [ICS,7]; H01M0008-10 [ICS,7]; C08L0101-00 [ICS,7]
IPCR C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01B0001-06 [I,A];
H01B0001-06 [I,C*]; H01M0008-02 [I,A]; H01M0008-02 [I,C*];
H01M0008-10 [I,A]; H01M0008-10 [I,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell sulfonated polymer electrolyte
structure
IT Fuel cell electrolytes
(structure and manufacture of sulfonated polymer electrolyte
membranes for fuel cells)
IT 116875-10-6DP, sulfonated 210531-45-6P
(in manufacture of sulfonated polymer electrolyte
membranes for fuel cells)
IT 9041-80-9DP, Poly(phenylene oxide), sulfonated 854669-40-2DP,
sulfonated 854669-46-8DP, sulfonated
(structure and manufacture of sulfonated polymer electrolyte
membranes for fuel cells)
OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS
RECORD (2 CITINGS)

L94 ANSWER 6 OF 11 HCA COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 142:412637 HCA Full-text
TITLE: Block copolymer and use for polymeric electrolyte of fuel cell
INVENTOR(S): Onodera, Toru; Sasaki, Shigeru; Yashiki, Daizaburo
PATENT ASSIGNEE(S): Sumitomo Chemical Company, Limited, Japan
SOURCE: PCT Int. Appl., 36 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2005037892 | A1 | 20050428 | WO 2004-JP15666 | 200410 15 |
| | | | <-- | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| JP 2005139432 | A | 20050602 | JP 2004-264988 | 200409 13 |
| | | | <-- | |
| JP 4424129 | B2 | 20100303 | | |
| CA 2542687 | A1 | 20050428 | CA 2004-2542687 | 200410 15 |
| | | | <-- | |
| EP 1674498 | A1 | 20060628 | EP 2004-792808 | 200410 15 |
| | | | <-- | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK | | | | |
| CN 1867615 | A | 20061122 | CN 2004-80030191 | 200410 15 |
| | | | <-- | |
| US 20070066759 | A1 | 20070322 | US 2006-575949 | 200604 13 |
| | | | <-- | |
| US 7803884 | B2 | 20100928 | | |
| KR 2006115381 | A | 20061108 | KR 2006-7008715 | 200605 04 |
| | | | <-- | |

PRIORITY APPLN. INFO.: JP 2003-357441 A 200310 17
<--
WO 2004-JP15666 W 200410 15
<--

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A block copolymer including one or more segments having an acid radical and one or more another segments practically having no acid radical is disclosed, wherein the segment practically having no acid radical includes a repeating structure Ar1ZAr2O Ar3O (wherein m is an integer not less than 10; Ar1, Ar2, and Ar3 independently represent a divalent aromatic group which may be substituted by an alkyl group having 1-10 carbon atoms, an alkoxy group having 1-10 carbon atoms, an aryl group having 6-10 carbon atoms, or an aryloxy group having 6-10 carbon atoms; Z represents CO or SO2 and each Z in the resp. segments independently represents CO or SO2). The block copolymer exhibits excellent performance as a polymer electrolyte for fuel cells or the like. Reacting 2,6-dihydroxynaphthalene with 4,4'-difluorodiphenylsulfone and treating with hydroquinonesulfonic acid K salt and 4,4'-difluorodiphenylsulfone-3,3'-disulfonic acid dipotassium salt gave a block copolymer with number mol. weight 5.2 + 104. Bar coating an NMP solution of this copolymer on a porous polyethylene membrane, drying at 80°, and soaking in aqueous HCl gave an electrolyte composite membrane with proton conductivity 1.16 + 10-1 S/cm.

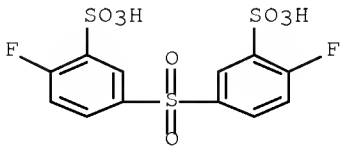
IT 850537-55-2P 850537-56-3P,
2,6-Dihydroxynaphthalene-4,4'-difluorodiphenylsulfone-hydroquinonesulfonic acid potassium salt-4,4'-difluorodiphenylsulfone-3,3'-disulfonic acid dipotassium salt block copolymer
(polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)

RN 850537-55-2 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, dipotassium salt, polymer with [1,1'-biphenyl]-4,4'-diol, 2,5-dihydroxybenzenesulfonic acid monopotassium salt, 2,2',3,3',5,5',6,6'-octafluoro[1,1'-biphenyl]-4,4'-diol and 1,1'-sulfonylbis[4-fluorobenzene], block (9CI) (CA INDEX NAME)

CM 1

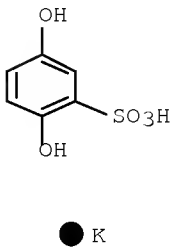
CRN 816417-98-8
CMF C12 H8 F2 O8 S3 . 2 K




●2 K

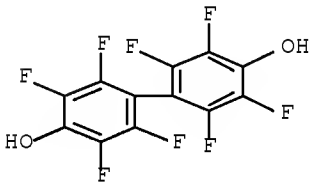
CM 2

CRN 21799-87-1
CMF C6 H6 O5 S . K



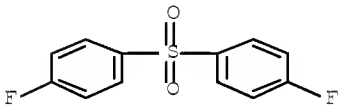
CM 3

CRN 2200-70-6
CMF C12 H2 F8 O2



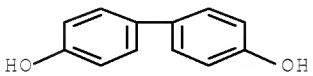
CM 4

CRN 383-29-9
CMF C12 H8 F2 O2 S



CM 5

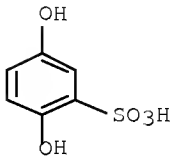
CRN 92-88-6
CMF C12 H10 O2



RN 850537-56-3 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, dipotassium salt, homopolymer, polymer with 2,6-naphthalenediol, potassium 2,5-dihydroxybenzenesulfonate and 1,1'-sulfonylbis[4-fluorobenzene], block (9CI) (CA INDEX NAME)

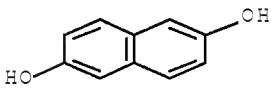
CM 1

CRN 21799-87-1
CMF C6 H6 O5 S . K



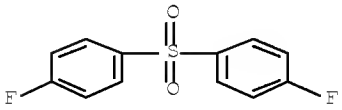
CM 2

CRN 581-43-1
CMF C10 H8 O2



CM 3

CRN 383-29-9
CMF C12 H8 F2 O2 S

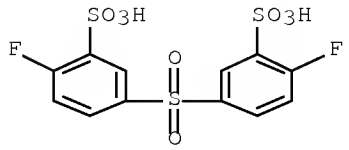


CM 4

CRN 850537-54-1
CMF (C12 H8 F2 O8 S3 . 2 K)x
CCI PMS

CM 5

CRN 816417-98-8
CMF C12 H8 F2 O8 S3 . 2 K



●2 K

IPCI C08G0081-00 [ICM,7]; H01B0001-12 [ICS,7]; H01M0008-02 [ICS,7]; H01M0008-10 [ICS,7]
IPCR C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08G0065-48 [I,A]; C08G0075-00 [I,C*]; C08G0075-23 [I,A]; H01B0001-12 [I,C*]; H01B0001-12 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 35, 52
ST polyether polysulfone block copolymer polyelectrolyte fuel cell; dihydroxynaphthalene difluorodiphenylsulfone hydroquinonesulfonic difluorodiphenylsulfonedisulfonic acid block copolymer
IT Catalysts
Fuel cell separators
Polyelectrolytes
(polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT Polysulfones, uses
(polyether-, fluorine-containing; polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT Polysulfones, uses
(polyether-; polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT Fluoropolymers, uses
(polyether-polysulfone-; polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell
)
IT Polyethers, uses
(polysulfone-, fluorine-containing; polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT Polyethers, uses
(polysulfone-; polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT 850537-55-2P 850537-56-3P, 2,6-Dihydroxynaphthalene-4,4'-difluorodiphenylsulfone-hydroquinonesulfonic acid potassium salt-4,4'-difluorodiphenylsulfone-3,3'-disulfonic acid dipotassium salt block copolymer
(polyether polysulfone block copolymer and use for polymeric electrolyte of fuel cell)
IT 9002-88-4, Polyethylene
(polyether polysulfone block copolymer and use for polymeric

electrolyte of fuel cell)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Asahi Glass Engineering | 2003 | | | JP 2003155361 A | HCA |
| Hossein, G | 2003 | 44 | 814 | Polymer Preprints | |
| Sumitomo Chemical Co Lt | 2003 | | | EP 1274147 A2 | HCA |
| Sumitomo Chemical Co Lt | 2003 | | | CN 1394889 A | HCA |
| Sumitomo Chemical Co Lt | 2003 | | | US 20030044669 A1 | |
| Sumitomo Chemical Co Lt | 2003 | | | JP 200317090 A | |
| Sumitomo Chemical Co Lt | 2003 | | | KR 20034097 A | |
| Sumitomo Chemical Co Lt | 2003 | | | JP 200341031 A | |
| Sumitomo Chemical Co Lt | 2003 | | | CA 2392241 A1 | HCA |
| Tosoh Corp | 2004 | | | JP 2004263052 A | HCA |
| Ube Industries Ltd | 2002 | | | WO 0291507 A1 | |
| Ube Industries Ltd | 2002 | | | EP 1394879 A1 | HCA |
| Ube Industries Ltd | 2002 | | | JP 200331232 A2 | |
| Ube Industries Ltd | 2002 | | | US 20040101730 A1 | HCA |

OS.CITING REF COUNT: 7 THERE ARE 7 CAPLUS RECORDS THAT CITE THIS RECORD (22 CITINGS)

L94 ANSWER 7 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:41470 HCA Full-text
TITLE: Polymer electrolyte membranes, membrane electrodes, and fuel cells
INVENTOR(S): Nakamura, Masataka; Adachi, Masaya; Izuhara, Daisuke; Ito, Nobuaki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 30 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2004342610 | A | 20041202 | JP 2004-127903 | 200404 23 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2003-120114 | A 200304 24 |
| | | | <-- | |

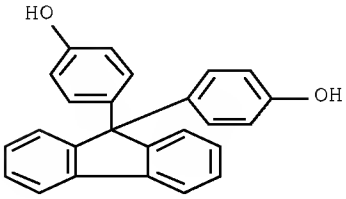
AB The disclosed polymer electrolyte is characterized in that the proton conductivity of the electrolyte measured immediately after taken out of an aqueous methanol solution does not increase even if the concentration of the methanolin the aqueous solution is increased. Preferably, the permeability of the methanol in the electrolyte membrane increases with increase of the methanol concentration Membrane electrode assembly and direct methanol fuel cells prepared by using the electrolyte membranes are also disclosed.

IT 116875-10-6DP, sulfonated
(polymer electrolyte for direct methanol fuel cells)

RN 116875-10-6 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

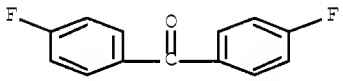
CM 1

CRN 3236-71-3
CMF C25 H18 O2



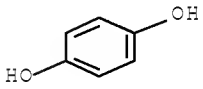

CM 2

CRN 345-92-6
CMF C13 H8 F2 O




CM 3

CRN 123-31-9
CMF C6 H6 O2




IPCI H01M0008-02 [ICM,7]; H01B0001-06 [ICS,7]; H01M0008-10 [ICS,7]; C08G0065-34 [ICS,7]; C08G0065-00 [ICS,7,C*]
IPCR C08G0065-00 [N,C*]; C08G0065-34 [N,A]; H01B0001-06 [I,A]; H01B0001-06 [I,C*]; H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-10 [I,A]; H01M0008-10 [I,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35
ST polymer electrolyte membrane direct methanol fuel cell
IT Fuel cell electrolytes
(polymer; polymer electrolytes for direct methanol fuel cells)
IT 116875-10-6DP, sulfonated 216689-01-9DP,

sulfonated
(polymer electrolyte for direct methanol fuel cells)

L94 ANSWER 8 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:317249 HCA Full-text
TITLE: Solid polymer electrolyte and proton conducting membrane
INVENTOR(S): Kanaoka, Nagayuki; Iguchi, Masaru; Mitsuta, Naoki; Sohma, Hiroshi; Ohtsuki, Toshihiro
PATENT ASSIGNEE(S): Honda Motor Co., Ltd., Japan; JSR Corporation
SOURCE: Eur. Pat. Appl., 32 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| EP 1465277 | A1 | 20041006 | EP 2004-6601 | 200403 18 |
| | | | <-- | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK | | | | |
| JP 2004285116 | A | 20041014 | JP 2003-76192 | 200303 19 |
| | | | <-- | |
| JP 4080925 | B2 | 20080423 | | |
| JP 2004285117 | A | 20041014 | JP 2003-76193 | 200303 19 |
| | | | <-- | |
| JP 4080926 | B2 | 20080423 | | |
| JP 2004285118 | A | 20041014 | JP 2003-76194 | 200303 19 |
| | | | <-- | |
| JP 3816061 | B2 | 20060830 | | |
| JP 2004285283 | A | 20041014 | JP 2003-81768 | 200303 25 |
| | | | <-- | |
| JP 4080928 | B2 | 20080423 | | |
| US 20040214065 | A1 | 20041028 | US 2004-804228 | 200403 19 |
| | | | <-- | |
| US 7030206 | B2 | 20060418 | | |
| PRIORITY APPLN. INFO.: | | | JP 2003-76192 A | 200303 19 |
| | | | <-- | |
| | | | JP 2003-76193 A | 200303 19 |

<-- JP 2003-76194 A 200303 19 <-- JP 2003-81768 A 200303 25 <--

AB The invention aims to provide a sulfonic acid group-containing polymer having improved hot water resistance and radical resistance (durability), a solid polymer electrolyte including the polymer, and a proton-conducting membrane including the electrolyte, the polymer electrolyte includes a sulfonated product of a polymer shown by the following general formula [X]a[Y]b[Z]c wherein X, Y, and Z are bonded randomly, alternately, or in blocks, b represents an integer of two or more, and each of a and c represents an integer of zero or more, where a + c > 2.

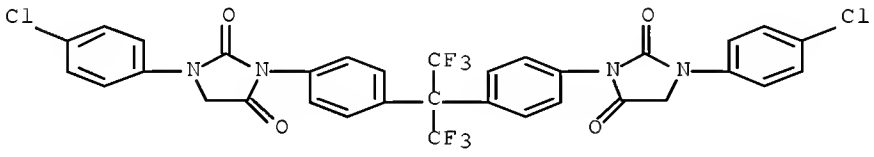
IT 768370-50-9DP, sulfonated 768370-51-0DP, sulfonated 768370-53-2DP, sulfonated 768370-54-3DP, sulfonated 768370-56-5DP, sulfonated 768370-58-7DP, sulfonated 768370-59-8DP, sulfonated 768394-50-9DP, sulfonated 768394-52-1DP, sulfonated 768394-54-3DP, sulfonated 768394-56-5DP, sulfonated
(solid polymer electrolyte and proton conducting membrane )

RN 768370-50-9 HCA

CN 2,4-Imidazolidinedione, 3,3'-[[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]di-4,1-phenylene]bis[1-(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

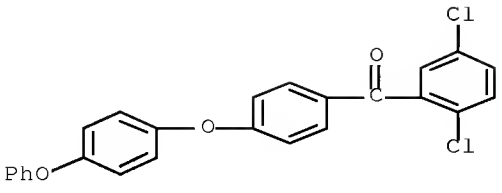
CM 1

CRN 768370-49-6
CMF C33 H20 Cl2 F6 N4 O4




CM 2

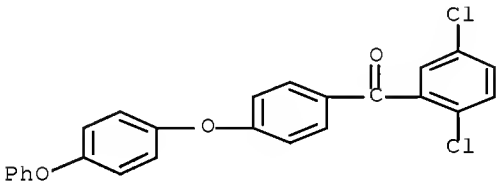
CRN 463954-50-9
CMF C25 H16 Cl2 O3



RN 768370-51-0 HCA
CN Imidazolidinetrione, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

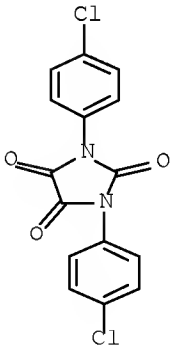
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



CM 2

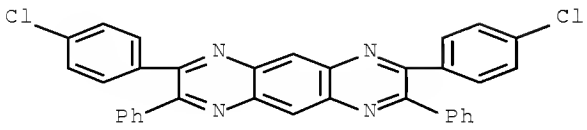
CRN 81657-50-3
CMF C15 H8 Cl2 N2 O3



RN 768370-53-2 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]-, polymer with 3,7-bis(4-chlorophenyl)-2,8-diphenylpyrazino[2,3-g]quinoxaline (9CI) (CA INDEX NAME)

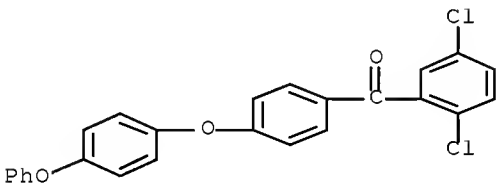
CM 1

CRN 768370-52-1
CMF C34 H20 Cl2 N4




CM 2

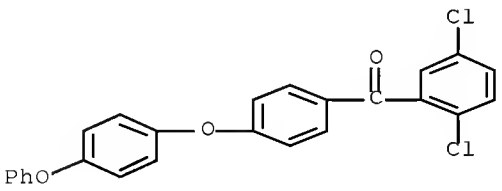
CRN 463954-50-9
CMF C25 H16 Cl2 O3




RN 768370-54-3 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with 2,5-bis(4-chlorophenyl)-1,3,4-oxadiazole, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol], block (9CI) (CA INDEX NAME)

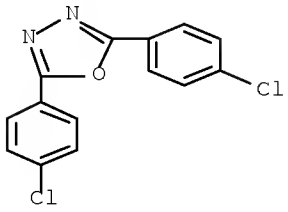
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



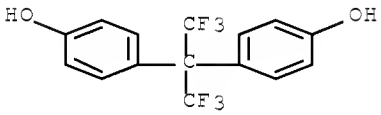

CM 2

CRN 2491-90-9
CMF C14 H8 Cl2 N2 O



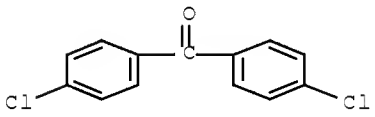
CM 3

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 4

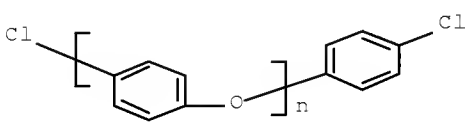
CRN 90-98-2
CMF C13 H8 Cl2 O



RN 768370-56-5 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]-, polymer with α-(4-chlorophenyl)-ω-chloropoly(oxy-1,4-phenylene) (9CI) (CA INDEX NAME)

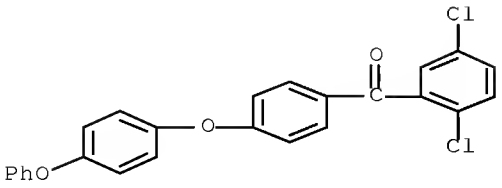
CM 1

CRN 768370-55-4
CMF (C6 H4 O)n C6 H4 Cl2
CCI PMS



CM 2

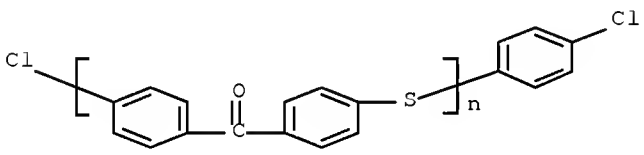
CRN 463954-50-9
CMF C25 H16 Cl2 O3



RN 768370-58-7 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]-, polymer with α-(4-chlorophenyl)-ω-chloropoly(thio-1,4-phenylenecarbonyl-1,4-phenylene) (9CI) (CA INDEX NAME)

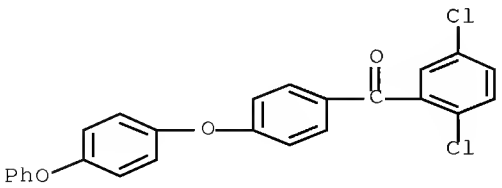
CM 1

CRN 768370-57-6
CMF (C13 H8 O S)n C6 H4 Cl2
CCI PMS



CM 2

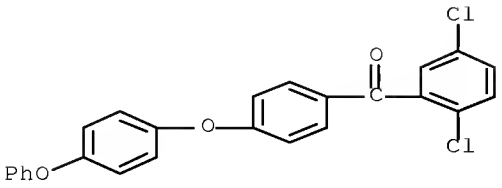
CRN 463954-50-9
CMF C25 H16 Cl2 O3



RN 768370-59-8 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with α-(4-chlorophenyl)-ω-chloropoly(thio-1,4-phenylene), (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol], block (9CI) (CA INDEX NAME)

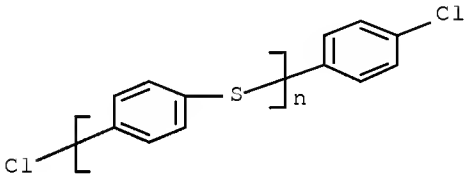
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



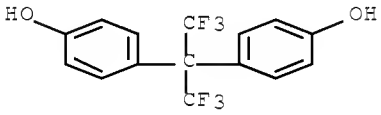

CM 2

CRN 99821-92-8
CMF (C6 H4 S)n C6 H4 Cl2
CCI PMS



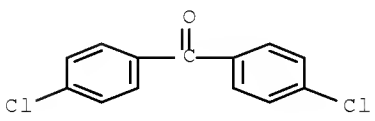

CM 3

CRN 1478-61-1
CMF C15 H10 F6 O2




CM 4

CRN 90-98-2
CMF C13 H8 Cl2 O



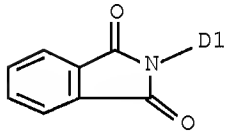
RN 768394-50-9 HCA
CN 1H-Isoindole-1,3(2H)-dione, ar,ar'-oxybis[2-(chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone (9CI) (CA INDEX NAME)

CM 1

CRN 768394-49-6
CMF C28 H14 Cl2 N2 O5
CCI IDS

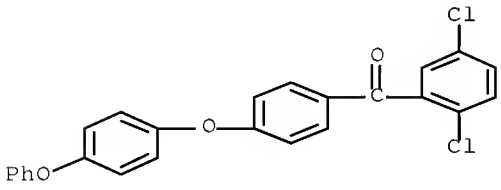
1/2 ( D1—O—D1 )

D1—Cl




CM 2

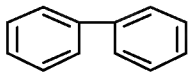
CRN 463954-50-9
CMF C25 H16 Cl2 O3




RN 768394-52-1 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]-, polymer with ar,ar'-oxybis[2-(ar'-chloro[1,1'-biphenyl]-ar-yl)-2,3-dihydro-1H-benzotriazole] (9CI) (CA INDEX NAME)

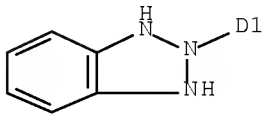
CM 1

CRN 768394-51-0
CMF C36 H26 Cl2 N6 O
CCI IDS



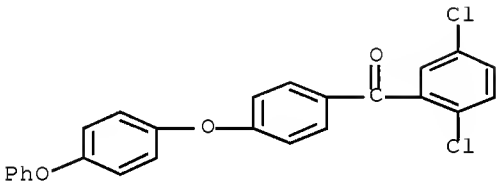
1/2 ( D1—O—D1 )

D1—Cl




CM 2

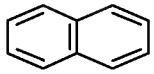
CRN 463954-50-9
CMF C25 H16 Cl2 O3




RN 768394-54-3 HCA
CN Methanone, (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]-, polymer with ar,ar'-oxybis[2-(chloronaphthalenyl)-2,3-dihydro-1,2,3-benzothiadiazole] (9CI) (CA INDEX NAME)

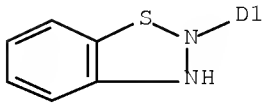
CM 1

CRN 768394-53-2
CMF C32 H20 Cl2 N4 O S2
CCI IDS



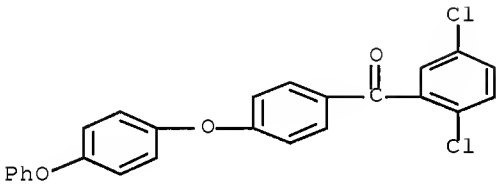
1/2 ( D1—O—D1 )

D1—Cl




CM 2

CRN 463954-50-9
CMF C25 H16 Cl2 O3



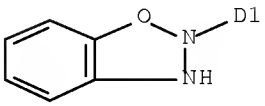

RN 768394-56-5 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone, ar,ar'-oxybis[2-(chlorophenyl)-2,3-dihydro-1,2,3-benzoxadiazole] and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol], block (9CI) (CA INDEX NAME)

CM 1

CRN 768394-55-4
CMF C24 H16 Cl2 N4 O3
CCI IDS

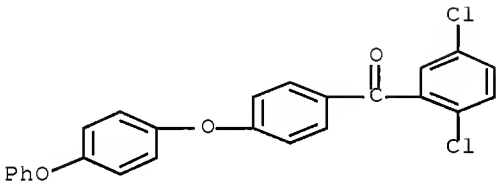
1/2 ( D1—O—D1 )

D1—Cl



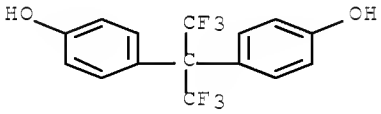

CM 2

CRN 463954-50-9
CMF C25 H16 Cl2 O3



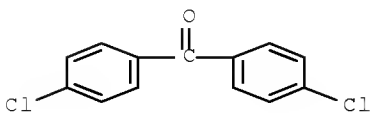

CM 3

CRN 1478-61-1
CMF C15 H10 F6 O2




CM 4

CRN 90-98-2
CMF C13 H8 Cl2 O



IPCI H01M0008-10 [ICM,7]; H01M0010-40 [ICS,7]; H01M0010-36 [ICS,7,C*]
IPCR C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01M0004-90 [N,C*];
H01M0004-92 [N,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A];
H01M0008-10 [I,C*]; H01M0008-10 [I,A]; H01M0010-36 [I,C*];
H01M0010-40 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72, 76
ST proton conducting membrane fuel cell
IT Fuel cells
(proton exchange membrane; solid polymer electrolyte
and proton conducting membrane)
IT Electrolytic cells
Gas sensors
Hygrometers
Membranes, nonbiological
Solid electrolytes
(solid polymer electrolyte and proton conducting membrane
)
IT Polymers, uses
(sulfonated; solid polymer electrolyte and proton conducting
membrane)
IT 768370-50-9DP, sulfonated 768370-51-0DP,
sulfonated 768370-53-2DP, sulfonated
768370-54-3DP, sulfonated 768370-56-5DP,
sulfonated 768370-58-7DP, sulfonated
768370-59-8DP, sulfonated 768370-60-1DP,
sulfonated 768370-61-2DP, sulfonated 768394-50-9DP,
sulfonated 768394-52-1DP, sulfonated
768394-54-3DP, sulfonated 768394-56-5DP,
sulfonated 768394-57-6DP, sulfonated
(solid polymer electrolyte and proton conducting membrane
)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Anon | | | | WO 0238650 A1 | HCA |
| Anon | | | | EP 1138712 A2 | HCA |
| Anon | | | | EP 1274147 A2 | HCA |
| Anon | | | | WO 9424717 A1 | HCA |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L94 ANSWER 9 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:280351 HCA Full-text
TITLE: Polymer electrolyte material, polymer electrolyte parts, membrane-electrode laminate, and polymer electrolyte fuel cell
INVENTOR(S): Adachi, Shinya; Izuhara, Daisuke; Nakamura, Masataka; Ito, Nobuaki
PATENT ASSIGNEE(S): Toray Industries, Inc., Japan
SOURCE: PCT Int. Appl., 147 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent

LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2004079844 | A1 | 20040916 | WO 2004-JP2894 | 20040305 |
| | | | <-- | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO | | | | |
| RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| JP 2004269599 | A | 20040930 | JP 2003-59569 | 20030306 |
| | | | <-- | |
| CA 2518414 | A1 | 20040916 | CA 2004-2518414 | 20040305 |
| | | | <-- | |
| EP 1619735 | A1 | 20060125 | EP 2004-717850 | 20040305 |
| | | | <-- | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK | | | | |
| CN 1757130 | A | 20060405 | CN 2004-80006115 | 20040305 |
| | | | <-- | |
| CN 100364160 | C | 20080123 | | |
| JP 2005174897 | A | 20050630 | JP 2004-121470 | 20040416 |
| | | | <-- | |
| US 20060180796 | A1 | 20060817 | US 2005-548110 | 20050906 |
| | | | <-- | |
| US 7713449 | B2 | 20100511 | | |

| PRIORITY APPLN. INFO.: | | |
|---|---|---|
| JP 2003-59569 | A | 20030306 |
| | <-- | |
| JP 2003-116685 | A | 20030422 |
| | <-- | |
| JP 2003-120115 | A | 20030424 |

<--
JP 2003-386734 A
200311
17
<--
JP 2003-386735 A
200311
17
<--
WO 2004-JP2894 W
200403
05
<--

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The electrolyte material has a nonfreezing water fraction (Rw1) of 20-100 in a hydrous state {Rw1 = [Wnf/(Wfc + Wnf)]; Wnf= amount of nonfreezing water per g of dry weight of polymer electrolyte material; and Wfc= amount of low m.p. water per g of dry weight of polymer electrolyte material}. The parts, the laminate, and the fuel cell use the above material. The fuel cell, using the above material, has excellent proton-conductivity and fuel cutoff properties and improved efficiency.

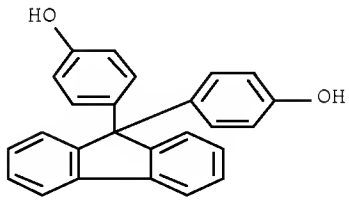
IT 116875-10-6D, sulfonated 116875-11-7D, sulfonated 125658-29-9D, sulfonated 132109-45-6D, sulfonated 132139-83-4D, sulfonated 136691-69-5D, sulfonated 146027-07-8D, sulfonated 146088-68-8D, sulfonated 199610-91-8D, sulfonated 758706-30-8D, sulfonated 758706-31-9D, sulfonated 758706-34-2D, sulfonated 758706-35-3D, sulfonated
(fuel cells containing polymer electrolyte materials with controlled nonfreezing water fraction for improved efficiency)

RN 116875-10-6 HCA

CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

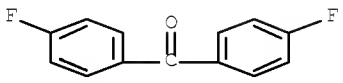
CM 1

CRN 3236-71-3
CMF C25 H18 O2



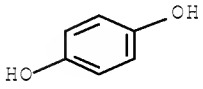

CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

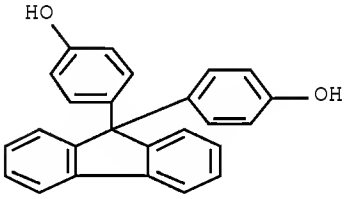
CRN 123-31-9
CMF C6 H6 O2



RN 116875-11-7 HCA
CN 1,4-Benzenediol, polymer with 4,4'-(9H-fluoren-9-ylidene)bis[phenol] and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

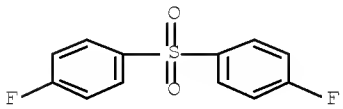
CM 1

CRN 3236-71-3
CMF C25 H18 O2



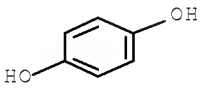
CM 2

CRN 383-29-9
CMF C12 H8 F2 O2 S



CM 3

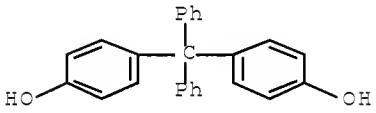
CRN 123-31-9
CMF C6 H6 O2



RN 125658-29-9 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(diphenylmethylene)bis[phenol] (9CI) (CA INDEX NAME)

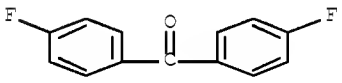
CM 1

CRN 1844-01-5
CMF C25 H20 O2



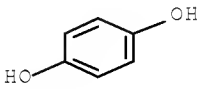
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

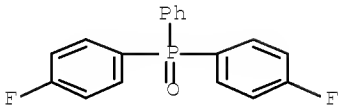
CRN 123-31-9
CMF C6 H6 O2



RN 132109-45-6 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide (9CI) (CA INDEX NAME)

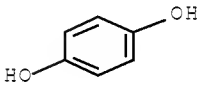
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P

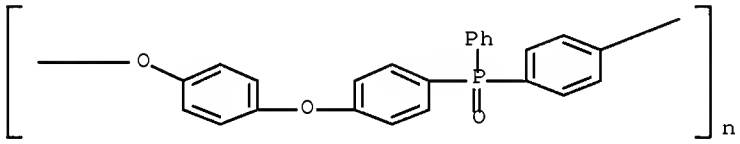


CM 2

CRN 123-31-9
CMF C6 H6 O2



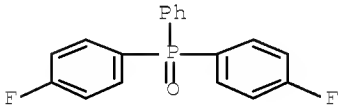
RN 132139-83-4 HCA
CN Poly[oxy-1,4-phenyleneoxy-1,4-phenylene(phenylphosphinylidene)-1,4-phenylene] (9CI) (CA INDEX NAME)



RN 136691-69-5 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and bis(4-fluorophenyl)phenylphosphine oxide (9CI) (CA INDEX NAME)

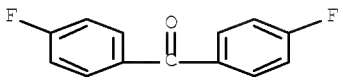
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



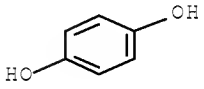
CM 2

CRN 345-92-6
CMF C13 H8 F2 O

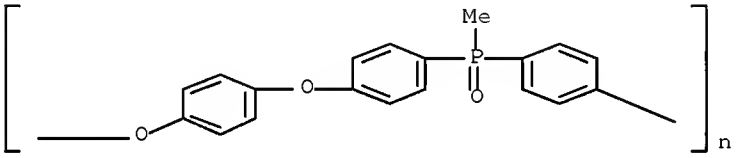


CM 3

CRN 123-31-9
CMF C6 H6 O2



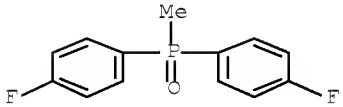
RN 146027-07-8 HCA
CN Poly[oxy-1,4-phenyleneoxy-1,4-phenylene(methylphosphinylidene)-1,4-phenylene] (9CI) (CA INDEX NAME)



RN 146088-68-8 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)methylphosphine oxide (9CI) (CA INDEX NAME)

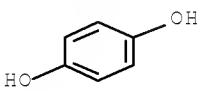
CM 1

CRN 25186-24-7
CMF C13 H11 F2 O P



CM 2

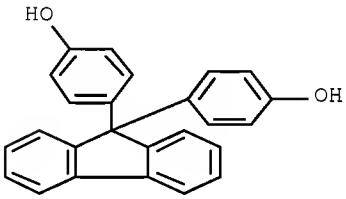
CRN 123-31-9
CMF C6 H6 O2



RN 199610-91-8 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,3-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (CA INDEX NAME)

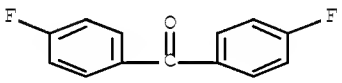
CM 1

CRN 3236-71-3
CMF C25 H18 O2



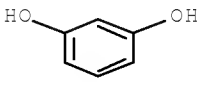
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

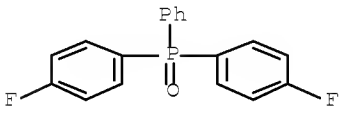
CRN 108-46-3
CMF C6 H6 O2



RN 758706-30-8 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide and 1,1'-sulfonylbis[4-fluorobenzene] (9CI) (CA INDEX NAME)

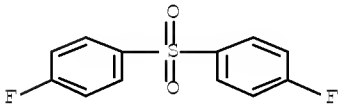
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



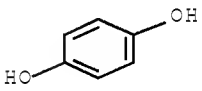
CM 2

CRN 383-29-9
CMF C12 H8 F2 O2 S



CM 3

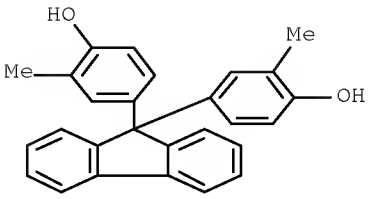
CRN 123-31-9
CMF C6 H6 O2



RN 758706-31-9 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with 1,4-benzenediol and 4,4'-(9H-fluoren-9-ylidene)bis[2-methylphenol] (9CI) (CA INDEX NAME)

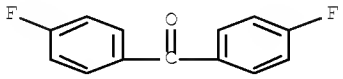
CM 1

CRN 88938-12-9
CMF C27 H22 O2



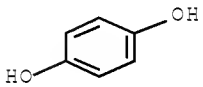
CM 2

CRN 345-92-6
CMF C13 H8 F2 O



CM 3

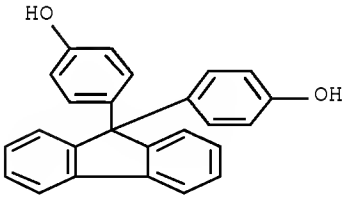
CRN 123-31-9
CMF C6 H6 O2



RN 758706-34-2 HCA
CN Methanone, bis(4-fluorophenyl)-, polymer with [1,1'-biphenyl]-2,5-diol and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

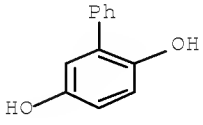
CM 1

CRN 3236-71-3
CMF C25 H18 O2



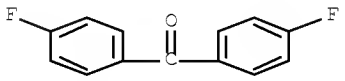
CM 2

CRN 1079-21-6
CMF C12 H10 O2



CM 3

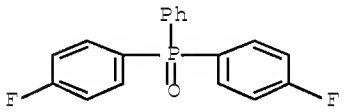
CRN 345-92-6
CMF C13 H8 F2 O



RN 758706-35-3 HCA
CN 1,4-Benzenediol, polymer with bis(4-fluorophenyl)phenylphosphine oxide and 4,4'-(9H-fluoren-9-ylidene)bis[phenol] (9CI) (CA INDEX NAME)

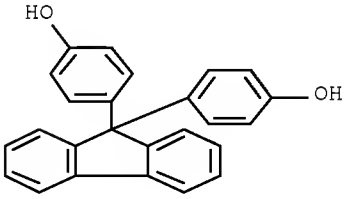
CM 1

CRN 54300-32-2
CMF C18 H13 F2 O P



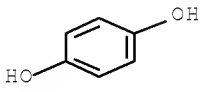
CM 2

CRN 3236-71-3
CMF C25 H18 O2



CM 3

CRN 123-31-9
CMF C6 H6 O2



IPCI H01M0008-02 [ICM,7]; C08G0079-04 [ICS,7]; C08G0079-00 [ICS,7,C*];
C08G0075-02 [ICS,7]; C08G0075-20 [ICS,7]; C08G0075-00 [ICS,7,C*];
C08G0065-40 [ICS,7]; C08G0065-00 [ICS,7,C*]; H01B0001-06 [ICS,7]
IPCR C08G0065-00 [I,C*]; C08G0065-40 [I,A]; C08G0075-00 [I,C*];
C08G0075-02 [I,A]; C08G0075-20 [I,A]; C08G0079-00 [I,C*];
C08G0079-04 [I,A]; C09K0005-00 [I,C*]; C09K0005-20 [I,A];
H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01B0001-12 [I,C*];
H01B0001-12 [I,A]; H01M0004-86 [N,C*]; H01M0004-86 [N,A];
H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-90 [N,C*];
H01M0004-92 [N,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A];
H01M0008-04 [I,C*]; H01M0008-04 [I,A]; H01M0008-10 [I,C*];
H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell polymer electrolyte material
nonfreezing water fraction control
IT Polyoxyalkylenes, uses
(fluorine- and sulfo-containing, ionomers; fuel
cells containing polymer electrolyte materials with
controlled nonfreezing water fraction for improved efficiency)
IT Fuel cell electrolytes
Fuel cells
(fuel cells containing polymer electrolyte
materials with controlled nonfreezing water fraction for improved
efficiency)
IT Carbon fibers, uses
Fluoropolymers, uses
(fuel cells containing polymer electrolyte
materials with controlled nonfreezing water fraction for improved
efficiency)
IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-containing, ionomers; fuel
cells containing polymer electrolyte materials with
controlled nonfreezing water fraction for improved efficiency)
IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-containing; fuel
cells containing polymer electrolyte materials with
controlled nonfreezing water fraction for improved efficiency)
IT 7440-44-0, Carbon, uses 9002-84-0, PTFE 12779-05-4
65978-77-0D, sulfonated 106444-61-5D, sulfonated 108809-07-0D,
sulfonated 116875-10-6D, sulfonated
116875-11-7D, sulfonated 122159-35-7D,
sulfonated 123349-32-6D, sulfonated 125658-29-9D,
sulfonated 132109-45-6D, sulfonated
132139-83-4D, sulfonated 136691-69-5D,
sulfonated 146027-07-8D, sulfonated
146088-68-8D, sulfonated 199610-91-8D,
sulfonated 349672-97-5D, sulfonated 673477-33-3D,
sulfonated 758706-29-5D, sulfonated 758706-30-8D,
sulfonated 758706-31-9D, sulfonated
758706-32-0D, sulfonated 758706-33-1D, sulfonated
758706-34-2D, sulfonated 758706-35-3D,
sulfonated
(fuel cells containing polymer electrolyte

materials with controlled nonfreezing water fraction for improved efficiency)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Dainippon Ink And Chemi | 1993 | | | JP 05-271460 A | HCA |
| Hatanaka, T | 2002 | 37 | 59 | R & D Review of Toyo | HCA |
| Nitto Denko Corp | 2001 | | | JP 2001294705 A | HCA |
| Nitto Denko Corp | 2001 | | | JP 2001294706 A | HCA |
| Sumitomo Chemical Co Lt | 1981 | | | JP 56-34329 B2 | HCA |
| Toa Nenryo Kogyo Kabush | 1989 | | | JP 64-22932 A | |
| Tonen Corp | 1996 | | | JP 08-180891 A | HCA |
| Toyota Central Research | 1998 | | | JP 10-340732 A | HCA |
| Toyota Central Research | 2002 | | | JP 2002324559 A | HCA |
| University Of Southern | 2001 | | | WO 2001504636 A | |
| University Of Southern | 2001 | | | US 6444343 B1 | HCA |
| University Of Southern | 2001 | | | WO 9822989 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | WO 0015691 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | WO 0119896 A1 | HCA |
| Victrex Manufacturing L | 2002 | | | JP 2002524631 A | |
| Walker, M | 1999 | 74 | 67 | Journal of Applied P | HCA |

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (5 CITINGS)

L94 ANSWER 10 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 139:396487 HCA Full-text
TITLE: Sulfonated copolymer for polymer electrolyte membrane
INVENTOR(S): Cao, Shuguang; Xu, Helen; Chen, Jingping
PATENT ASSIGNEE(S): Polyfuel, Inc., USA
SOURCE: PCT Int. Appl., 32 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 6
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2003095509 | A1 | 20031120 | WO 2003-US15178 | 20030513 |

<--

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

| | | | | |
|---|---|---|---|---|
| AU 2003237849 | A1 | 20031111 | AU 2003-237849 | 200305 |

```
                                                                    13
                                                                <--
     AU 2003237849          B2     20090702
     CA 2485727             A1     20031120    CA 2003-2485727
                                                                200305
                                                                13
                                                                <--
     EP 1517929             A1     20050330    EP 2003-736609
                                                                200305
                                                                13
                                                                <--
     EP 1517929             B1     20100714
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
             PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,
             SK
     CN 1668656             A      20050914    CN 2003-816349
                                                                200305
                                                                13
                                                                <--
     CN 100509875           C      20090708
     JP 2006506472          T      20060223    JP 2004-503520
                                                                200305
                                                                13
                                                                <--
     AT 474005              T      20100715    AT 2003-736609
                                                                200305
                                                                13
                                                                <--
     KR 977234              B1     20100823    KR 2004-7018336
                                                                200305
                                                                13
                                                                <--
     US 20060135657         A1     20060622    US 2006-350228
                                                                200602
                                                                07
                                                                <--
PRIORITY APPLN. INFO.:                          US 2002-381136P     P
                                                                200205
                                                                14
                                                                <--
                                                US 2002-426540P     P
                                                                200211
                                                                15
                                                                <--
                                                US 2003-446395P     P
                                                                200302
                                                                10
                                                                <--
                                                US 2003-449299P     P
                                                                200302
                                                                20
                                                                <--
                                                US 2003-438299      A3
                                                                200305
                                                                13
                                                                <--
                                                WO 2003-US15178     W
                                                                200305
                                                                13
                                                                <--
```

AB This invention relates to sulfonated copolymers for proton-conducting membranes allowing the dimensional stability of polymer electrolyte membrane over a wide temperature range and avoiding excessive membrane swelling in direct methanol fuel cells. The method for the preparation of a sulfonated polymers is included the steps of combining a first monomer having at least one sulfonate group and having at least two leaving groups with a second comonomer having at least two groups that can displace at least one leaving group of the first monomer and a third comonomer having at least two leaving groups, and a fourth comonomer having at least two displacing groups that can react with the leaving groups of either said first comonomer or said third comonomer and is used for proton exchange membranes, catalyst coated membranes and membrane electrode assembly preparation Exampled polymer is prepared by heating of the mixture of 9.13 g of bisphenol A, 5.67 g of 4,4'-difluorobenzophenone, 5.91 g of 4,4'-difluoro-3,3'-disulfonyl-benzophenone and 7.2 g of potassium carbonate in a mixture of DMSO and toluene at 150° for 4 h and keeping at at 180° for 6 h with further precipitation with acetone or methanol. The dry polymer is dissolved in DMAC for 20% coating solution and the obtained 2 mil thick membrane is soaked in sulfuric acid for 16 h.

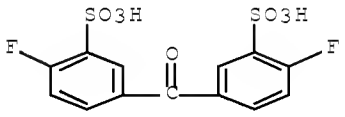
IT 625392-08-7P 625392-10-1P 625392-14-5P
625392-16-7P 625392-26-9P 625392-28-1P
625392-30-5P 625392-32-7P
(sulfonated copolymer for polymer electrolyte membrane)

RN 625392-08-7 HCA

CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with 1,4-benzenediol, bis(4-fluorophenyl)methanone and 4,4'-(1-methylethylidene)bis[phenol] (9CI) (CA INDEX NAME)

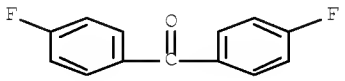
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



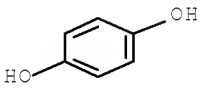

CM 2

CRN 345-92-6
CMF C13 H8 F2 O



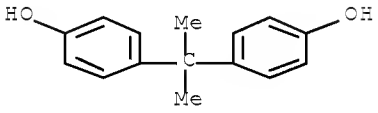

CM 3

CRN 123-31-9
CMF C6 H6 O2



CM 4

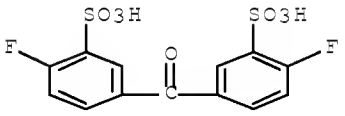
CRN 80-05-7
CMF C15 H16 O2



RN 625392-10-1 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with bis(4-fluorophenyl)methanone and 4,4'-thiobis[phenol] (9CI) (CA INDEX NAME)

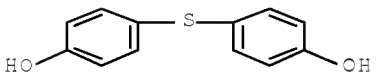
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



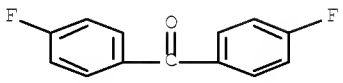
CM 2

CRN 2664-63-3
CMF C12 H10 O2 S



CM 3

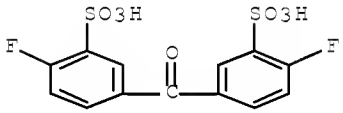
CRN 345-92-6
CMF C13 H8 F2 O



RN 625392-14-5 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with 1,4-benzenediol, bis(4-fluorophenyl)methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

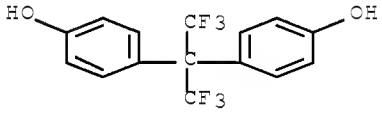
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



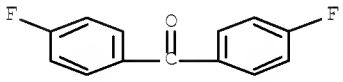
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



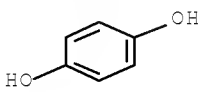
CM 3

CRN 345-92-6
CMF C13 H8 F2 O



CM 4

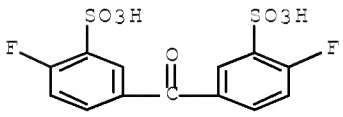
CRN 123-31-9
CMF C6 H6 O2



RN 625392-16-7 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with 1,4-benzenediol, bis(4-fluorophenyl)methanone and 4,4'-cyclohexylidenebis[phenol] (9CI) (CA INDEX NAME)

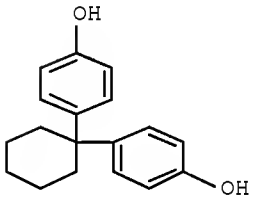
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



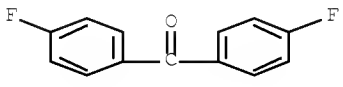
CM 2

CRN 843-55-0
CMF C18 H20 O2



CM 3

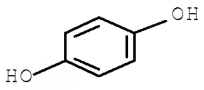
CRN 345-92-6
CMF C13 H8 F2 O



CM 4

CRN 123-31-9

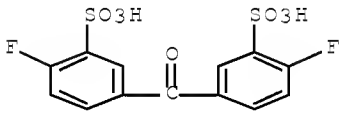
CMF C6 H6 O2



RN 625392-26-9 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with bis(4-fluorophenyl)methanone, 4,4'-cyclohexylidenebis[phenol] and 4,4'-oxybis[phenol] (9CI) (CA INDEX NAME)

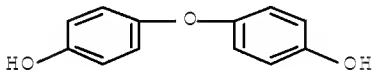
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



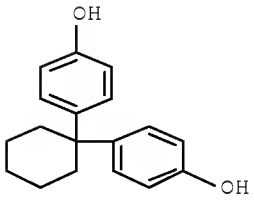
CM 2

CRN 1965-09-9
CMF C12 H10 O3



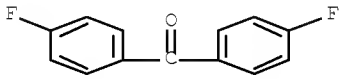
CM 3

CRN 843-55-0
CMF C18 H20 O2



CM 4

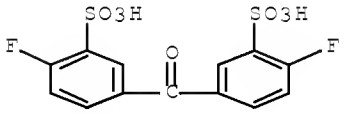
CRN 345-92-6
CMF C13 H8 F2 O



RN 625392-28-1 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with bis(4-fluorophenyl)methanone, 4,4'-(9H-fluoren-9-ylidene)bis[phenol] and 4,4'-oxybis[phenol] (9CI) (CA INDEX NAME)

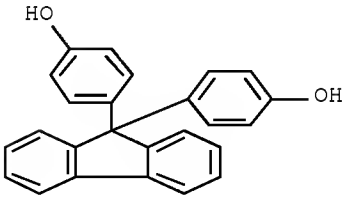
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



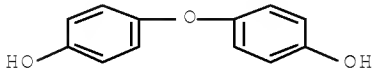
CM 2

CRN 3236-71-3
CMF C25 H18 O2



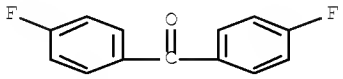
CM 3

CRN 1965-09-9
CMF C12 H10 O3



CM 4

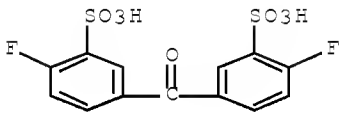
CRN 345-92-6
CMF C13 H8 F2 O



RN 625392-30-5 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with bis(4-fluorophenyl)methanone, 4,4'-oxybis[phenol] and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

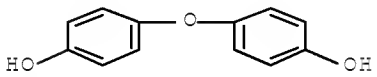
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



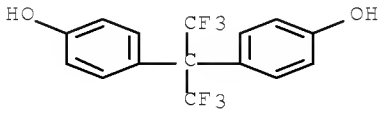
CM 2

CRN 1965-09-9
CMF C12 H10 O3



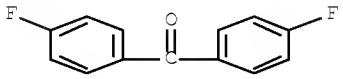
CM 3

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 4

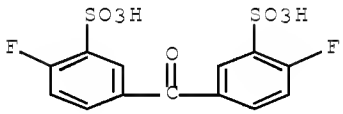
CRN 345-92-6
CMF C13 H8 F2 O



RN 625392-32-7 HCA
CN Benzenesulfonic acid, 3,3'-carbonylbis[6-fluoro-, polymer with bis(4-fluorophenyl)methanone and 4'-methyl[1,1'-biphenyl]-2,5-diol (9CI) (CA INDEX NAME)

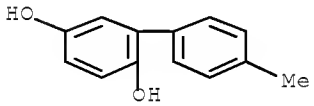
CM 1

CRN 625392-06-5
CMF C13 H8 F2 O7 S2



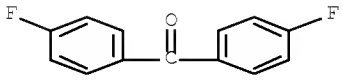
CM 2

CRN 10551-32-3
CMF C13 H12 O2



CM 3

CRN 345-92-6
CMF C13 H8 F2 O



IPCI C08F0016-36 [ICM,7]; C08F0016-00 [ICM,7,C*]

IPCR B01D0067-00 [I,C*]; B01D0067-00 [I,A]; B01D0071-00 [I,C*];
B01D0071-52 [I,A]; B01D0071-82 [I,A]; C08F0016-00 [I,C*];
C08F0016-00 [I,A]; C08F0016-36 [I,A]; C08G0065-00 [I,C*];
C08G0065-40 [I,A]; C08G0065-48 [I,A]; C08L0071-00 [I,C*];
C08L0071-00 [I,A]; C08L0081-00 [I,C*]; C08L0081-06 [I,A];
H01M0008-10 [I,C*]; H01M0008-10 [I,A]

CC 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 52

ST sulfonated copolymer direct methanol fuel cell;
proton exchange membrane catalyst coated membrane
membrane electrode assembly

IT Polyketones
(polyether-, aromatic, cardo, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyketones
(polyether-, aromatic, fluorine-containing, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyketones
(polyether-, aromatic, sulfonated; sulfonated copolymer for polymer electrolyte membrane)

IT Polyketones
(polyether-, ionomers, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Fluoropolymers, preparation
Polythioethers
(polyether-polyketone-, aromatic, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polysulfones, preparation
(polyether-polyketone-, cardo, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Cardo polymers
(polyether-polyketone-polysulfones, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Cardo polymers
(polyether-polyketones, aromatic, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyketones
(polyether-polysulfone-, cardo, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyketones
(polyether-polythioether-, aromatic, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-, aromatic, cardo, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-, aromatic, fluorine-containing, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-, aromatic, sulfonated; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-, ionomers, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-polysulfone-, cardo, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Polyethers, preparation
(polyketone-polythioether-, aromatic, sulfo-containing; sulfonated copolymer for polymer electrolyte membrane)

IT Fuel cell electrolytes
Membranes, nonbiological
(sulfonated copolymer for polymer electrolyte membrane)
IT 625392-07-6P 625392-08-7P 625392-10-1P
625392-12-3P 625392-14-5P 625392-16-7P
625392-17-8P 625392-19-0P 625392-21-4P 625392-23-6P
625392-25-8P 625392-26-9P 625392-28-1P
625392-30-5P 625392-32-7P 625392-35-0P
625392-38-3P
(sulfonated copolymer for polymer electrolyte membrane)

RETABLE

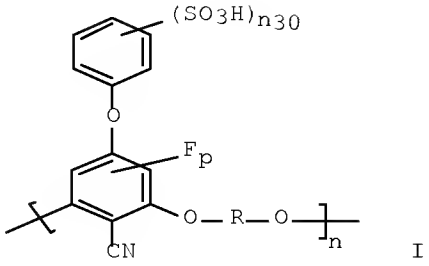
| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Gan | 2001 | 50 | 812 | Polymer Internationa | HCA |
| Liu | 2001 | 222 | 579 | Macromol Rapid Commu | |
| Liu | 2001 | 42 | 3293 | Polymer | HCA |
| McGrath | 2002 | | | US 20020091225 A1 | HCA |
| Wang | 1998 | 199 | 1421 | Macromol Chem Phys | HCA |
| Xiao | 2002 | 48 | 309 | Polymer Bulletin | HCA |

OS.CITING REF COUNT: 5 THERE ARE 5 CAPLUS RECORDS THAT CITE THIS RECORD (5 CITINGS)

L94 ANSWER 11 OF 11 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 138:386506 HCA Full-text
TITLE: Sulfonated fluoropolymers, their resin compositions, and fuel cell electrolytes therefrom
INVENTOR(S): Sakaguchi, Yoshimitsu; Kaji, Atsushi; Takase, Satoshi; Kimura, Kunio; Gomi, Tomonori; Okumura, Yasunori; Omote, Kazushi
PATENT ASSIGNEE(S): Toyobo Co., Ltd., Japan; Nippon Shokubai Co., Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 28 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2003147075 | A | 20030521 | JP 2001-352042 | 200111 16 |
| JP 4208455 | B2 | 20090114 | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2001-352042 | 200111 16 |
| | | | <-- | |

GI



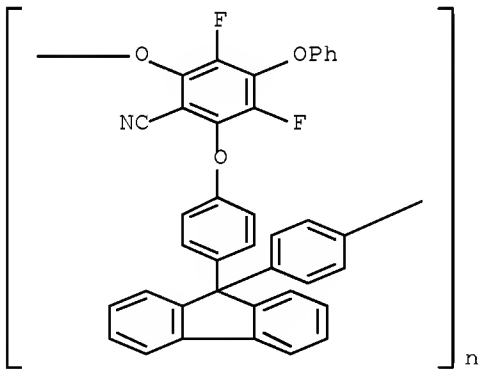

I

AB The polymers have repeating unit (C6H4mFmCOC6H4-qXqOC6H4-q'X'q'COC6H4-m'Fm'ORO) [m, m' = 0-4 (m + m' = 1-8); X, X' = halo, C1-6 alkyl(oxy); q, q' = 0-4; R = sulfonated bivalent residues of (hexafluoro)bisphenol A, bisphenol TP, bisphenol F, 9,9-bis[4-hydroxy(-3-methyl)phenyl]fluorene, etc. (Markush given)], or are represented by I (p = 1, 2; R = the same to above). Thus, 2.0 g 4,4'-bis(2,3,4,5,6-pentafluorobenzoyl)diphenyl ether was copolymd. with 1.25 g 9,9-bis(4-hydroxyphenyl)fluorene and sulfonated with concentrate H2SO4 to give a polymer, which formed a 15-μm-thick cast film showing ion conductivity 0.10 S/cm and 3% weight loss temperature 310°.

IT 343310-33-8DP, sulfonated
(sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

RN 343310-33-8 HCA

CN Poly[oxy(2-cyano-4,6-difluoro-5-phenoxy-1,3-phenylene)oxy-1,4-phenylene-9H-fluoren-9-ylidene-1,4-phenylene] (CA INDEX NAME)




IPCI C08G0065-40 [I,A]; C08G0065-00 [I,C*]; C08L0071-12 [I,A]; C08L0071-00 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,A]; H01M0008-10 [I,A]

IPCR C08G0065-00 [I,C*]; C08G0065-40 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]; C08L0071-00 [I,C]; C08L0071-12 [I,A]

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST hydroxyphenylfluorene fluorobenzoyldiphenyl ether polyelectrolyte

fuel cell; heat stable polyelectrolyte sulfonated cardo fluoropolymer; sulfonated phenoxyfluorobenzonitrile hydroxyphenylfluorene electrolytic membrane

IT Fluoropolymers, uses
(cardo, cyano, polyoxyarylenes; properly sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT Polyoxyarylenes
(cardo, fluorine-containing, sulfonated; properly sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT Cardo polymers
(fluorine-containing, cyano, polyoxyarylenes; properly sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT Cardo polymers
(polyoxyarylenes, fluorine-containing, sulfonated; properly sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT Fuel cell electrolytes
Heat-resistant materials
Polyelectrolytes
(sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT Fluoropolymers, uses
(sulfonated; sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

IT 213693-06-2DP, sulfonated 213693-07-3DP, sulfonated 213693-10-8DP, sulfonated 213693-11-9DP, sulfonated 343310-32-7DP, sulfonated 343310-33-8DP, sulfonated 524932-24-9DP, sulfonated 524945-32-2DP, sulfonated
(sulfonated fluoropolymers forming heat-stable polyelectrolyte membranes for fuel cells)

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

----------(CRYSTALLINE MATERIAL--CLAIM 7)----------

=> D L96 1-5 IBIB ABS HITSTR HITIND RETABLE

L96 ANSWER 1 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 145:30867 HCA Full-text
TITLE: Membrane electrode assemblies (MEA) in polymer electrolyte fuel cells
INVENTOR(S): Fukuda, Kaoru; Matsuo, Junji
PATENT ASSIGNEE(S): Honda Motor Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| JP 2006140107 | A | 20060601 | JP 2004-330859 | 200411 15 |

<--

PRIORITY APPLN. INFO.: JP 2004-330859 200411 15

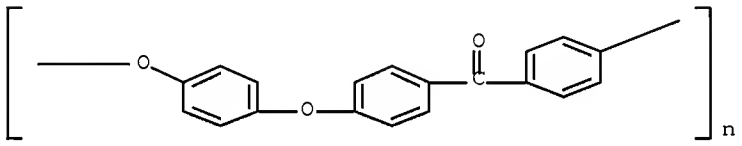
<--

AB The anode in the title MEA comprises a catalyst layer containing 1st catalyst-carrying particles and a 1st ion conductor, a water decomposition layer containing a 2nd catalyst-carrying particles, 2nd ion conductor, and crystalline C fibers, and a gas diffusion layer, in which the water content in the 2nd ion conductor is larger than that in the 1st ion conductor. Fuel cells with electrodes showing prevented performance drop on fuel shortage are obtained.

IT 31694-16-3D, PEEK, sulfonated
(ion conductor in water decomposition layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IPCI H01M0008-02 [I,A]; H01M0004-86 [I,A]; H01M0004-92 [I,A]; H01M0004-90 [I,C*]; H01M0004-96 [I,A]; H01M0008-10 [I,A]

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST membrane electrode assembly anode catalyst; ion conductor water content control anode MEA

IT Ionic conductors
(anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

IT Carbon fibers, uses
(crystalline, in water decomposition layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

IT Carbon black, uses
(in anode catalyst layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

IT Fuel cell anodes
(membrane electrode assemblies; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

IT Polyketones
(polyether-, sulfonated, ion conductor in water decomposition layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

IT Polyethers, uses
(polyketone-, sulfonated, ion conductor in water decomposition layer; anodes in MEA with catalyst layers and water decomposition

layers containing ion conductors with different water contents)
IT Fuel cells
(polymer electrolyte; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)
IT Platinum alloy, base
Ruthenium alloy, base
(anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)
IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 12779-05-4
(anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)
IT 501004-25-7, TEC 61E54
(in water decomposition layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)
IT 864442-38-6, Nafion DE 2021 888716-81-2, Flemion SH 20
(ion conductor in anode catalyst layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)
IT 31694-16-3D, PEEK, sulfonated
(ion conductor in water decomposition layer; anodes in MEA with catalyst layers and water decomposition layers containing ion conductors with different water contents)

L96 ANSWER 2 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:300971 HCA Full-text
TITLE: Ion exchange composite material based on proton conductive functionalized inorganic support compounds in a polymer matrix
INVENTOR(S): St.-Arnaud, Marc; Bebin, Philippe
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 20 pp., Cont.-in-part of Appl. No. PCT/CA03/00435.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| US 20050053818 | A1 | 20050310 | US 2004-949022 | 200409 24 |
| | | | <-- | |
| WO 2003083985 | A2 | 20031009 | WO 2003-CA435 | 200303 26 |
| | | | <-- | |
| WO 2003083985 | A3 | 20041216 | | |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,

BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

| | | | | |
|---|---|---|---|---|
| CA 2494430 | A1 | 20060324 | CA 2005-2494430 | 200501 26 <-- |
| EP 1646097 | A2 | 20060412 | EP 2005-20419 | 200509 20 <-- |
| EP 1646097 | A3 | 20081001 | | |
| EP 1646097 | B1 | 20100804 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU | | | | |
| AT 476761 | T | 20100815 | AT 2005-20419 | 200509 20 <-- |

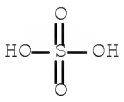
| | | | |
|---|---|---|---|
| PRIORITY APPLN. INFO.: | US 2002-367771P | P | 200203 28 <-- |
| | WO 2003-CA435 | A2 | 200303 26 <-- |
| | US 2004-949022 | A | 200409 24 <-- |

AB The composite material comprises acid functionalized inorg. supports such as silica dispersed in a functionalized and/or non-functionalized polymer matrix that is based on numerous polymers such as poly(aromatic ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liquid fuels commonly used in fuel cell technol., like hydrogen gas or methanol solution, is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

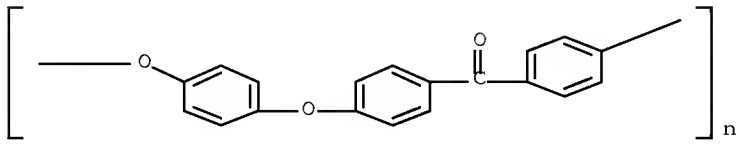
IT 7664-93-9, Sulfuric acid, processes
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

RN 7664-93-9 HCA

CN Sulfuric acid (CA INDEX NAME)



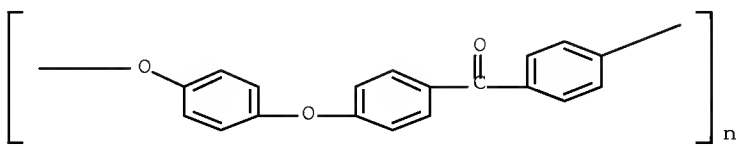
IT 31694-16-3D, PEEK, sulfonated
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



INCL 429030000; 429033000; 429046000; 204296000; 429044000; 429041000
IPCI H01M0008-10 [ICM,7]; H01M0004-86 [ICS,7]; H01M0004-90 [ICS,7]; H01M0004-96 [ICS,7]; H01M0008-08 [ICS,7]; H01M0008-14 [ICS,7]; C25B0013-00 [ICS,7]; C25C0007-04 [ICS,7]; C25C0007-00 [ICS,7,C*]
IPCR C25B0013-00 [I,C*]; C25B0013-00 [I,A]; C25C0007-00 [I,C*]; C25C0007-04 [I,A]; H01M0004-86 [I,C*]; H01M0004-86 [I,A]; H01M0004-90 [I,C*]; H01M0004-90 [I,A]; H01M0004-96 [I,C*]; H01M0004-96 [I,A]; H01M0008-08 [I,C*]; H01M0008-08 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]; H01M0008-14 [I,C*]; H01M0008-14 [I,A]
NCL 429/431.000; 204/296.000; 429/493.000; 429/516.000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 48, 56, 61, 72
ST fuel cell composite inorg compd polymer matrix
IT Membranes, nonbiological
(catalytic, acid; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Membranes, nonbiological
(desalination; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Air conditioning
Composites
Ion exchangers
Liquid crystals, polymeric
Sulfonation
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Separation
(membranes; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Fuel cells
(proton exchange membrane; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT 110-86-1, Pyridine, processes 302-04-5, Thiocyanate, processes 420-04-2, Cyanamide 661-20-1, Isocyanate 7664-38-2, Phosphoric acid, processes 7664-93-9, Sulfuric acid, processes 7803-51-2, Phosphine 13598-36-2, Phosphonic acid 13840-40-9, Phosphine oxide 14265-44-2, Phosphate, processes 15477-76-6, Phosphonate 32323-01-6, Imide
(ion exchange composite material based on proton conductive

functionalized inorg. support compds. in polymer matrix)
IT 1314-23-4, Zirconium oxide, uses 1344-28-1, Alumina, uses 7631-86-9D, Silica, acid functionalized 7631-86-9D, Silica, carboxylic acid functionalized 7631-86-9D, Silica, phosphonic acid functionalized 7631-86-9D, Silica, propylamine-functionalized 7631-86-9D, Silica, sulfonic acid functionalized 9002-84-0, Ptfe 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, POlystyrene 9003-56-9, Acrylonitrile-butadiene-styrene copolymer 9004-34-6, Cellulose, uses 13463-67-7, Titanium oxide, uses 24937-78-8, Ethylene-vinyl acetate copolymer 31694-16-3, Peek 31694-16-3D, PEEK, sulfonated 52352-27-9 150385-13-0, Poly(benzoyl-1,4-phenylene) 223537-84-6
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

L96 ANSWER 3 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:177887 HCA Full-text
TITLE: Polymer sulfonation - a versatile route to preparing proton-conducting membrane material for advanced technologies
AUTHOR(S): Zaidi, S. M. Javaid
CORPORATE SOURCE: Chemical Engineering Department, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia
SOURCE: Arabian Journal for Science and Engineering, Section B: Engineering (2003), 28(2B), 183-194
CODEN: AJSEF2; ISSN: 1319-8025
PUBLISHER: King Fahd University of Petroleum and Minerals
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Sulfonation of polymers is a viable method for making proton exchange membranes used in electrochem. devices. Polyether-ether ketone was modified by using concentrated H2SO4 (97.4%) to produce ion-containing polymers bearing HSO3 groups. The sulfonated polymer was characterized for IEC, 1HNMR, DSC, and H2O uptake etc. The degree of sulfonation of sulfonated PEEK was found to vary 40-80 mol%. The PEEK became amorphous after sulfonation (DSC and WXRD), which enhanced its solubility in organic solvents such as DMF. The glass transition temperature, Tg increased from 151° for pure PEEK to 217° upon sulfonation. The H2O uptake was also increased with sulfonation level, which provides formation of water-mediated pathways for protons involving SO3H groups. The membranes from these polymers have a high potential for use in electrochem. devices such as polymer fuel cell and electrodialysis.
IT 31694-16-3DP, sulfonated
(sulfonated PEEK as proton-conducting membrane material)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



```
CC   38-3 (Plastics Fabrication and Uses)
     Section cross-reference(s): 37
ST   polyether polyketone sulfonated proton exchange membrane;
     fuel cell separator polyether polyketone
     sulfonated
IT   Polyketones
        (polyether-, sulfonated, aromatic; sulfonated PEEK as
        proton-conducting membrane material)
IT   Polyethers, uses
        (polyketone-, sulfonated, aromatic; sulfonated PEEK as
        proton-conducting membrane material)
IT   Sulfonation
        (property modification by; sulfonated PEEK as proton-conducting
        membrane material)
IT   Fuel cells
        (proton exchange membrane; sulfonated PEEK as
        proton-conducting membrane material)
IT   Ionic conductors
        (protonic; sulfonated PEEK as proton-conducting membrane
        material)
IT   Crystallinity
       Fuel cell separators
     Glass transition temperature
     Solubility
        (sulfonated PEEK as proton-conducting membrane
        material)
IT   31694-16-3DP, sulfonated
        (sulfonated PEEK as proton-conducting membrane
        material)
RETABLE
   Referenced Author   |Year | VOL | PG   | Referenced Work     |
Referenced
         (RAU)         |(RPY)|(RVL)|(RPG) |      (RWK)          | File
=======================+=====+=====+======+=====================+=========
==
Appleby, A             |1996 |354  |1681  |Phil Trans Royal Soc|HCA
Atwood, T              |1979 |20   |191   |Polym Prep, Am Chem  |
Bailly, C              |1987 |28   |1009  |Polymer              |HCA
Bellamy, L             |1966 |     |64    |The Infrared Spectra|
Bishop, M              |1985 |18   |86    |Macromolecules       |HCA
Cerfontain, H          |1968 |     |      |Mechanical Aspect in|
Cui, W                 |1998 |14   |145   |Separation and Purif|HCA
Drzewinkski, M         |1985 |30   |4753  |J Appl Polym Sci     |
Faure, S               |1997 |     |818   |2nd Int Symp on New |HCA
Jin, X                 |1985 |17   |4     |British Polym J      |HCA
Kobayashi, T           |1998 |106  |219   |Solid State Ionics   |HCA
Liler, M               |1971 |     |      |Reaction Mechanisms  |
Nakanishi, K           |1962 |     |28    |Infrared Absorption  |
Nolte, R               |1993 |83   |211   |J Membrane Sci       |HCA
Noshay, A              |1976 |20   |1885  |J Appl Polym Sci     |HCA
O'Gara, J              |1987 |25   |1519  |J Polym Sci B: Polym|HCA
Rikukawam, K           |2000 |25   |1463  |Progress in Polymer  |
Savadogo, O            |1998 |1    |66    |J New Mat Electroche|
Shoesmith, J           |1994 |49   |129   |J Power Source       |HCA
Sivashinsky, N         |1983 |28   |3235  |J Appl Polym Sci     |HCA
Steck, A               |1997 |     |792   |Proc 2nd Int Symp on|HCA
Zaidi, S               |2000 |173  |17    |J Membrane Science   |HCA
Zaidi, S               |2000 |     |      |PhD Thesis, Laval Un|
```

OS.CITING REF COUNT: 7 THERE ARE 7 CAPLUS RECORDS THAT CITE THIS RECORD (7 CITINGS)

L96 ANSWER 4 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 136:343296 HCA Full-text
TITLE: Solid polymer electrolyte
INVENTOR(S): Hasegawa, Naoki; Taniguchi, Takumi; Kamiya, Atsushi; Kawakado, Masaya; Morimoto, Tomo
PATENT ASSIGNEE(S): Toyota Central Research and Development Laboratories, Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

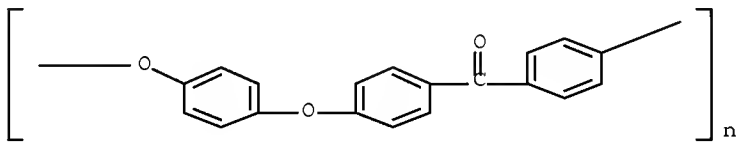
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2002124272 | A | 20020426 | JP 2000-315996 | 200010 17 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | JP 2000-315996 | 200010 17 |
| | | | <-- | |

AB The electrolyte is a polymer electrolyte heat treated at T±50° T = crystal m.p. or softening point of the electrolyte, during or after electron beam or radiation treatment.

IT 31694-16-3D, Peek, sulfonated
(heat and electron beam and radiation treatment of polymer electrolyte membranes for fuel cells and electrochem. devices)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IPCI H01M0008-02 [ICM,7]; C08J0003-28 [ICS,7]; G01N0027-416 [ICS,7]; G01N0027-406 [ICS,7]; H01B0001-06 [ICS,7]; H01M0008-10 [ICS,7]; C08L0101-00 [ICS,7]

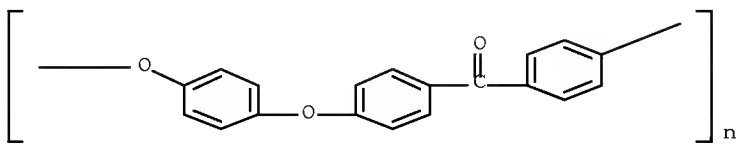
IPCR G01N0027-406 [I,C*]; G01N0027-406 [I,A]; C08J0003-28 [I,C*]; C08J0003-28 [I,A]; G01N0027-416 [I,C*]; G01N0027-416 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 72

ST polymer electrolyte treatment heat electron beam; radiation heat treatment polymer electrolyte; fuel cell polymer electrolyte

IT Electric apparatus
(electrochem.; heat and electron beam and radiation treatment of polymer electrolyte membranes for fuel cells and electrochem. devices)
IT Fuel cell electrolytes
Sensors
(heat and electron beam and radiation treatment of polymer electrolyte membranes for fuel cells and electrochem. devices)
IT Fluoropolymers, uses
(heat and electron beam and radiation treatment of polymer electrolyte membranes for fuel cells and electrochem. devices)
IT 24937-79-9, Poly(vinylidene fluoride) 31694-16-3D, Peek, sulfonated 163294-14-2, Nafion 112 417702-20-6D, perfluoroalkylsulfonic acid ethers derivs., polymers 418770-63-5, Nafion 112F
(heat and electron beam and radiation treatment of polymer electrolyte membranes for fuel cells and electrochem. devices)

L96 ANSWER 5 OF 5 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 130:40853 HCA Full-text
TITLE: Low cost membranes for PEM fuel cells
AUTHOR(S): Yen, Shiao-Ping "Elizabeth"; Kindler, Andrew; Yavrouian, Andre
CORPORATE SOURCE: Jet Propulsion Laboratory, Pasadena, CA, 91109-8099, USA
SOURCE: Proceedings of the Power Sources Conference ( 1998), 38th, 469-472
CODEN: PPOCFD
PUBLISHER: National Technical Information Service
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Aromatic semicryst. polymers such as poly p-Ph ether-ether ketone (PEEK) and poly-p-Ph ether sulfone (PES) were used as starting materials to produce proton conducting ionomers. These are sulfonated poly p-Ph ether-ether ketone (H-SPEEK) and sulfonated poly-p-Ph ether sulfone (H-SPES), resp. After numerous expts. with these 2 polymers it was determined that mixture of HSPES and PES or mixts. of different equivalent wts. of HSPES could be cast into useful, robust membranes. The newly prepared proton conducting membranes were incorporated into membrane electrode assemblies (MEA) and tested as working MeOH fuel cells. The best HSPES MEA delivered 387 mV at 300 mA/cm2, at 91° and 20 psig air using 1M MeOH.
IT 31694-16-3D, Peek, sulfonated
(low cost membranes for PEM fuel cells)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



```
CC   52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
     Section cross-reference(s): 38
ST   fuel cell membrane sulfonated polymer
IT   Fuel cells
        (MeOH; low cost membranes for PEM fuel
        cells)
IT   Electric conductivity
       Fuel cell electrolytes
        (low cost membranes for PEM fuel
        cells)
IT   Polyketones
     Polyketones
     Polysulfones, uses
     Polysulfones, uses
        (polyether-, aromatic, sulfonated; low cost membranes for
        PEM fuel cells)
IT   Polyethers, uses
     Polyethers, uses
        (polyketone-, aromatic, sulfonated; low cost membranes for
        PEM fuel cells)
IT   Polyethers, uses
     Polyethers, uses
        (polysulfone-, aromatic, sulfonated; low cost membranes
        for PEM fuel cells)
IT   Ionomers
        (proton conducting; low cost membranes for PEM
        fuel cells)
IT   25667-42-9 31694-16-3D, Peek, sulfonated
        (low cost membranes for PEM fuel
        cells)
IT   67-56-1, Methanol, uses
        (low cost membranes for PEM fuel
        cells)
RETABLE
   Referenced Author   |Year | VOL | PG   | Referenced Work    |
Referenced
         (RAU)         |(RPY)|(RVL)|(RPG) |      (RWK)         | File
=======================+=====+=====+======+====================+=========
==
Bailly, C              |1987 |28   |1009  |Polymer             |HCA
Linkous, C             |1993 |68   |122   |Proceedings of the A|HCA
Nolte, R               |1993 |83   |211   |J of Membrane Scienc|HCA


-------------(METHOD OF SULFONATING-CLAIMS 20-26)-----------------

=> D L98 1-21 IBIB ABS HITSTR HITIND RETABLE
THE ESTIMATED COST FOR THIS REQUEST IS 123.48 U.S. DOLLARS
DO YOU WANT TO CONTINUE WITH THIS REQUEST? (Y)/N:Y

L98  ANSWER 1 OF 21  HCA  COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER:        148:356260  HCA  Full-text
TITLE:                   Crosslinkable aromatic resin having protonic
                         acid group, and ion conductive polymer
                         membrane, binder and fuel
                         cell using the resin
INVENTOR(S):             Ishikawa, Junichi; Kuroki, Takashi; Fujiyama,
                         Satoko; Omi, Takehiko; Nakata, Tomoyuki; Okawa,
                         Yuichi; Miyazaki, Kazuhisa; Fujii, Shigeharu;
```

Tamai, Shoji
PATENT ASSIGNEE(S): Mitsui Chemicals, Inc., Japan
SOURCE: U.S., 55pp.
CODEN: USXXAM
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| US 7345135 | B2 | 20080318 | US 2004-820842 | 200404 09 |
| | | | <-- | |
| US 20040191602 | A1 | 20040930 | | |
| WO 2003033566 | A1 | 20030424 | WO 2002-JP10536 | 200210 10 |
| | | | <-- | |

W: CA, CN, IN, JP, KR, US
RW: DE, FR, GB, IT, SE

| | | | | |
|---|---|---|---|---|
| PRIORITY APPLN. INFO.: | | | JP 2001-312799 | A 200110 10 |
| | | | <-- | |
| | | | JP 2002-182252 | A 200206 21 |
| | | | <-- | |
| | | | WO 2002-JP10536 | A2 200210 10 |
| | | | <-- | |

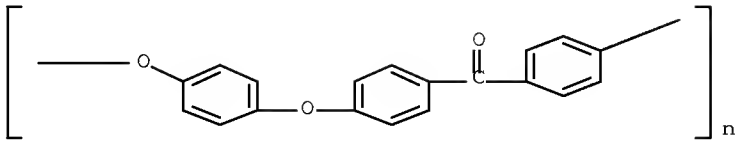
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A crosslinkable aromatic resin(such as polyethers, polyamides, polyimides, polyamideimides, polyazoles) having a protonic acid group and a crosslinkable group is prepared for suitable for electrolytic membranes and binders used in fuel cells. The crosslinking is not derived from the protonic acid group and the resin can form a polymer network without any elimination component and exhibits excellent ion conductivity, heat resistance, water resistance, adhesion property and low methanol permeability. Preferably, the crosslinkable group is composed of a C1-10 group directly bonded to the aromatic ring and/or an alkylene group having 1-3 carbon atoms in the main chain in which at least one carbon atom directly bonded to the aromatic ring bonds to hydrogen, and a carbonyl group, or a carbon-carbon double bond or triple bond. Thus, a polyether-polysulfone was prepared from disodium 3,3'-disulfonate-4,4'-difluorobenzophenone, 4,4'-difluorobenzophenone and 2,2-bis(3,5-dimethyl-4-hydroxyphenyl)propane.

IT 31694-16-3DP, PEEK450P, sulfonated
(PEEK450P; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



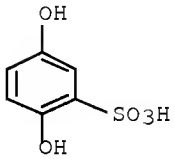
IT 515144-48-6P 1012792-22-1DP, sulfonated
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

RN 515144-48-6 HCA

CN Benzenesulfonic acid, 2,5-dihydroxy-, sodium salt (1:1), polymer with bis(4-fluorophenyl)methanone and 2,3,5,6-tetramethyl-1,4-benzenediol (CA INDEX NAME)

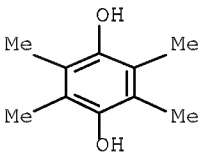
CM 1

CRN 10021-55-3
CMF C6 H6 O5 S . Na



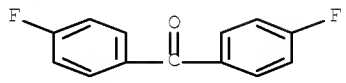
CM 2

CRN 527-18-4
CMF C10 H14 O2

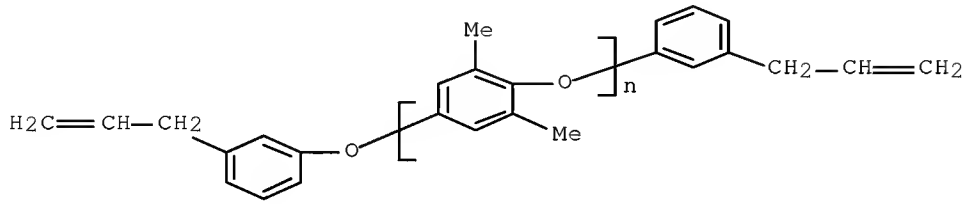


CM 3

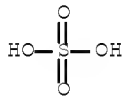
CRN 345-92-6
CMF C13 H8 F2 O



RN 1012792-22-1 HCA
CN Poly[oxy(2,6-dimethyl-1,4-phenylene)],
α-[3-(2-propen-1-yl)phenyl]-ω-[3-(2-propen-1-yl)phenoxy]-
(CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



INCL 528220000; 525330900; 525331200; 525328600; 429030000; 429034000; 429042000; 429310000; 429316000; 429317000
IPCI C08G0002-18 [I,A]; C08G0002-00 [I,C*]; C08G0006-00 [I,A]
IPCR C08G0002-00 [I,C]; C08G0002-18 [I,A]; C08G0006-00 [I,C]; C08G0006-00 [I,A]; C08G0065-00 [I,C*]; C08G0065-48 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; C08L0071-00 [I,C*]; C08L0071-00 [I,A]; C08L0071-12 [I,A]; C08L0081-00 [I,C*]; C08L0081-06 [I,A]; H01M0004-86 [N,C*]; H01M0004-86 [N,A]; H01M0004-88 [I,C*]; H01M0004-88 [I,A]; H01M0004-90 [N,C*]; H01M0004-92 [N,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
NCL 528/220.000; 429/310.000; 429/316.000; 429/317.000; 429/493.000; 429/510.000; 429/530.000; 525/328.600; 525/330.900; 525/331.200; 429/311.000; 429/312.000
CC 35-5 (Chemistry of Synthetic High Polymers)
ST arom polyether polyamide polyimide polyamideimide polyazole polysulfone; conductive polymer fuel cell membrane crosslinking; disodium disulfonatedifluorobenzophenone difluorobenzophenone bisdimethylhydroxyphenylpropane copolymer prepn
IT Anodes
Cathodes

Conducting polymers
Electrodes
Fuel cell separators
Sulfonation
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyamides
Polybenzoxazoles
Polyimides
Polyoxyphenylenes
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Crosslinking
(photochem.; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyketones
(polyamic acid-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polysulfones
(polyamic acid-polyketone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyketones
(polyamic acid-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyimides
Polyketones
(polyamide-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polysulfones
(polyamide-polyester-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polysulfones
(polyamide-polyketone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyesters
Polyketones
(polyamide-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyethers
(polybenzoxazole-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)

IT Fluoropolymers
(polybenzoxazole-polyether-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyamides
(polyester-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane

used for binder and fuel cell)
IT Polybenzoxazoles
Polyketones
(polyether-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polyketones
Polyphenyls
Polysulfides
Polysulfones
Polysulfones
(polyether-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polysulfones
(polyether-polyketone-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)
IT Fluoropolymers
Polysulfones
(polyether-polyketone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Fluoropolymers
(polyether-polyketone-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)
IT Polyketones
(polyether-polysulfone-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)
IT Polyketones
(polyether-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polyamides
Polyketones
(polyimide-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polysulfones
(polyimide-polyketone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polyketones
(polyimide-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polyethers
(polyketone-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)
IT Polyamic acids
Polyamides
Polyethers
Polyimides
(polyketone-; crosslinkable aromatic resin having protonic acid

group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyethers
(polyketone-polysulfone-, fluorine-containing; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)

IT Polyamic acids
Polyamides
Polyethers
Polyimides
(polyketone-polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyphosphoric acids
(polymers with 3,3'-diamino-4,4-bisphenol dihydrochloride and 4,4'-benzophenonedicarboxylic acid, sulfonated; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell
)

IT Polyethers
(polyphenyl-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyethers
(polysulfide-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Polyethers
Polyethers
(polysulfone-; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Crosslinking
(radiochem.; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT Crosslinking
(thermal; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 1012870-75-5P
((C29H18N2O13S2)n.2Na; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 10401-11-3DP, reaction products with bisphenol A-dichlorodiphenylsulfone-disodium 3,3'-disulfonate-4,4'-dichlorodiphenyl sulfone copolymer
(Bisphenol A-dichlorodiphenylsulfone-disodium 3,3'-disulfonate-4,4'-dichlorodiphenyl sulfone copolymer; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 31694-16-3DP, PEEK450P, sulfonated
(PEEK450P; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 964-68-1DP, 4,4'-Benzophenonedicarboxylic acid, polymers with 3,3'-diamino-4,4-bisphenol dihydrochloride and polyphosphoric acid, sulfonated

(Polyphosphoric acid; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 1592-35-4DP, polymers with 4,4'-benzophenonedicarboxylic acid and polyphosphoric acid, sulfonated
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 25134-01-4P, Poly(2,6-dimethyl-1,4-phenylene oxide) 127546-84-3P
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 1076-99-9DP, 4-Allylbenzoic acid, reaction products with polyether-polyketone 1745-89-7DP, reaction products wit fluoropolymer-polyether-polyketone 10601-99-7DP, 3-Ethynylbenzoic acid, reaction products wit fluoropolymer-polyether-polyketone 24938-67-8P, Poly(2,6-dimethyl-1,4-phenylene oxide) 25897-65-8P 28825-50-5P 29658-28-4P 32034-67-6P 39342-71-7DP, Poly(dimethylphenol), reaction products with 2-allylphenol, sulfonated 41205-96-3P 54571-77-6P 87089-64-3P 87781-17-7P 87792-34-5P 127546-84-3DP, sulfonated 127583-87-3P 127669-56-1P 146673-88-3DP, reaction products with 3-ethynylphenol 146673-88-3DP, reaction products with 4-ethynylfluorobenzene 267877-35-0DP, reaction products with 3-ethynylphenol 342047-78-3DP, reaction products with 3-ethynylphenol 342047-78-3P 342047-79-4DP, reaction products with 3-ethynylphenol 342047-79-4P 515144-26-0P 515144-27-1P 515144-28-2P 515144-29-3P 515144-30-6P 515144-31-7P 515144-32-8P 515144-34-0P 515144-35-1P 515144-36-2P 515144-37-3P 515144-38-4P 515144-41-9DP, sulfonated 515144-42-0P 515144-44-2DP, sulfonated 515144-44-2P 515144-45-3DP, sulfonated 515144-45-3P 515144-48-6P 515144-49-7P 515144-50-0P 515144-51-1DP, reaction products with 3-ethynylbenzoic acid 515144-51-1P 515144-53-3P 515144-54-4P 515144-55-5P 515144-56-6P 515144-57-7P 515144-58-8P 515144-59-9P 515144-60-2P 515144-61-3P 515144-62-4P 515144-64-6P 515144-65-7P 515144-66-8DP, reaction products with 3-ethynylphenol 515144-67-9P 515144-68-0DP, reaction products with 3-ethynylphenol 515144-69-1DP, reaction products with 3-ethynylphenol 515144-70-4DP, reaction products with 3-ethynylphenol 515144-75-9DP, reaction products with 3-ethynylphenol 515811-98-0P 1012791-98-8P 1012791-99-9P 1012792-00-5P 1012792-01-6P 1012792-05-0P 1012792-07-2P 1012792-14-1DP, sulfonated 1012792-14-1P 1012792-15-2P 1012792-18-5P 1012792-19-6P 1012792-20-9P 1012792-22-1DP, sulfonated 1012870-75-5DP, sulfonated
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 51698-33-0P 210531-45-6P, Disodium 3,3'-disulfonate-4,4'-difluorobenzophenone 515144-46-4P
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 50-00-0, Formaldehyde, reactions 80-05-7, 2,2-Bis(4-hydroxy-phenyl)-propane, reactions 80-07-9, 4,4'-Dichlorodiphenylsulfone 345-92-6, 4,4'-Difluorobenzophenone 598-03-8 766-98-3 1076-99-9, 4-Allylbenzoic acid 1745-89-7 7647-14-5, Sodium chloride, reactions 7757-83-7 10401-11-3, 3-Ethynylphenol 10601-99-7, 3-Ethynylbenzoic acid

(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 7664-93-9, Sulfuric acid, reactions 7790-94-5, Chlorosulfuric acid
(crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 210531-46-7P
(crosslinked; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 515144-39-5P 515144-40-8P
(optionally crosslinked; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 515144-71-5P
(polyamic acid; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 515144-71-5DP, reaction products with 3-ethynylphenol
(polyamic acid; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

IT 515144-24-8P
(uncrosslinked and crosslinked; crosslinkable aromatic resin having protonic acid group for ion conductive polymer membrane used for binder and fuel cell)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Anon | 1977 | | | JP 52-091788 A | HCA |
| Anon | 1977 | | | JP 52-099982 | HCA |
| Anon | 1988 | | | JP 63-305904 A | HCA |
| Anon | 1990 | | | JP 02-248434 A | HCA |
| Anon | 1992 | | | JP 04-130140 A | HCA |
| Anon | 1992 | | | JP 04-144062 A | HCA |
| Anon | 1994 | | | JP 06-093114 A | HCA |
| Anon | 1996 | | | WO 9629359 | HCA |
| Anon | 1998 | | | JP 10-045913 A | HCA |
| Anon | 1999 | | | JP 11-067224 A | HCA |
| Anon | 2000 | | | WO 0015691 | HCA |
| Anon | 2000 | | | WO 0066254 A1 | HCA |
| Anon | 2000 | | | JP 2000299117 A | HCA |
| Anon | 2000 | | | JP 2000501223 A | |
| Anon | 2001 | | | WO 0125312 | HCA |
| Anon | 2002 | | | JP 2002105199 | HCA |
| Anon | 2002 | | | JP 2002121281 | HCA |
| Anon | 2002 | | | JP 2002358978 | HCA |
| Anon | 2002 | | | JP 2002367627 | HCA |
| Anon | 2003 | | | JP 2003012795 A | HCA |
| Anon | 2003 | | | JP 2003068327 A | HCA |
| Anon | 2003 | | | JP 2003147075 A | HCA |
| Anon | 2003 | | | JP 2003217342 A | HCA |
| Anon | 2003 | | | JP 2003217343 A | HCA |
| Anon | 2004 | | | JP 2004047244 A | HCA |
| Anon | 2002 | | | Japanese Published A | |

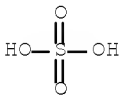
| | | | | | |
|---|---|---|---|---|---|
| Anon | 2002 | | | Japanese Published A | |
| Anon | 2002 | | | Japanese Published A | |
| Anon | 2002 | | | Japanese Published A | |
| Faure | 2001 | | | US 20010020082 A1 | HCA |
| Helmer-Metzmann | 1995 | | | US 5438082 A | HCA |
| Helmer-Metzmann | 1996 | | | US 5561202 A | HCA |
| Helmer-Metzmann | 1998 | | | US 5741408 A | HCA |
| Helmer-Metzmann | 2001 | | | US 6214488 B1 | HCA |
| Honma, I | 1999 | | 17 | The Third Separation | |
| Iwasaki | 2000 | | | US 6087031 A | HCA |
| Kerres | 2002 | | | US 20020103306 A1 | HCA |
| Liu, S | 2001 | | 3293 | Polymer | HCA |
| Mao | 2000 | | | US 6090895 A | HCA |
| McGrath | 2002 | | | US 20020091225 A1 | HCA |
| Roberts | 2001 | | | US 6180559 B1 | HCA |
| Schnurnberger | 2001 | | | US 6221923 B1 | HCA |
| Wang, F | 1998 | 199 | 1421 | Macromol Chem Phys | HCA |
| Wang, F | 1999 | | 795 | Polymer | HCA |
| Yen | 1998 | | | US 5795496 A | HCA |

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

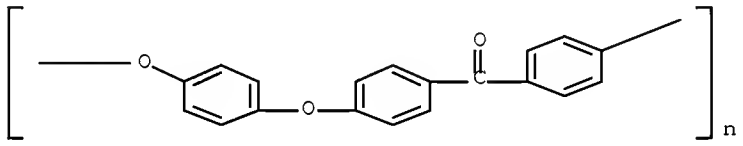
L98 ANSWER 2 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 145:66070 HCA Full-text
TITLE: SiO2/sulfonated PEEK doped with dodecatunstophosphoric acid hybrid materials - preparation and properties
AUTHOR(S): Wu, Han-Lang; Ma, Chen-Chi M.
CORPORATE SOURCE: Department of Chemical Engineering, National Tsing-Hua University, Taiwan
SOURCE: Composites Technologies for 2020, Proceedings of the Asian-Australasian Conference on Composite Materials (ACCM-4), 4th, Sydney, Australia, July 6-9, 2004 (2004), 876-881. Editor(s): Ye, Lin; Mai, Yiu-Wing; Su, Zhongqing. Woodhead Publishing Ltd.: Cambridge, UK.
CODEN: 69HLWP; ISBN: 1-85573-831-7
DOCUMENT TYPE: Conference
LANGUAGE: English

AB A novel organic/inorg. proton conducting composite membrane based on sulfonated poly (ether ether ketone)(sPEEK) for utilizing in the polymer electrolyte has been prepared The composite membrane was modified with dodecatungstophosphoric acid (PWA) and colloidal silica (SiO2). Results show that the longer the sulfonation time, the higher the proton conductivity However, it may cause over swelling. The modification with PWA shows increasing in the proton conductivity, however, when PWA content is over 40phr, phase separation may occur. PWA leaking problem was found in membrane durability testing, but the modification with SiO2 will reduce the degree of PWA leaking and the swelling of membrane. The degree of methanol crossover was also investigated in this study. Comparing to Nafion membrane, sPEEK/PWA organic/inorg. composite membrane possesses almost the same proton conductivity of 0.05 S/cm at room temperature, but has the lower methanol permeability (2*10-7 cm2/s). Consequently, the sPEEK/PWA organic/inorg. composite membrane may be suitable for the application of direct methanol fuel cell (DMFC).

IT 7664-93-9, Sulfuric acid, uses
(SiO2/sulfonated PEEK doped with dodecatungstophosphoric acid hybrid materials)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3D, PEEK 450G, sulfonated
(SiO2/sulfonated PEEK doped with
dodecatungstophosphoric acid hybrid materials)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA
INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 49
IT Fuel cell separators
(direct-methanol, PEM; SiO2/sulfonated PEEK doped with
dodecatungstophosphoric acid hybrid materials)
IT 67-56-1, Methanol, uses 872-50-4, NMP, uses 7664-93-9,
Sulfuric acid, uses
(SiO2/sulfonated PEEK doped with dodecatungstophosphoric acid
hybrid materials)
IT 1343-93-7 7631-86-9, Silica, uses 31694-16-3D, PEEK
450G, sulfonated
(SiO2/sulfonated PEEK doped with
dodecatungstophosphoric acid hybrid materials)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Alberti, G | 2001 | 185 | 73 | J Membrane Science | HCA |
| Chang, J | 2003 | 124 | 18 | J Membrane Science | HCA |
| Chiang, C | 2003 | | | ICCM-14 (Internation | |
| Honma, I | 1999 | 120 | 255 | Solid State Ionics | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membrane Science | HCA |
| Kuan, H | 2003 | | | ICCM-14 (Internation | |
| Mikhailenko, S | 2000 | 38 | 1386 | J Polymer Science: P | HCA |
| Ponce, M | 2003 | 217 | 5 | J Membrane Science | HCA |
| Wilhelm, F | 2002 | 199 | 167 | J Membrane Science | HCA |
| Zaidi, S | 2000 | 173 | 17 | J Membrane Science | HCA |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS
RECORD (1 CITINGS)

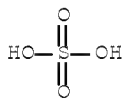
L98 ANSWER 3 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:436093 HCA Full-text

TITLE: Improved proton conducting membrane, process for fabrication and application in a fuel cell
INVENTOR(S): Glipa, Xavier; Berthelot, Sylvie; Getton, Frederick; Grasset, Frederic; Jones, Deborah; Roziere, Jacques
PATENT ASSIGNEE(S): Peugeot Citroen Automobiles SA, Fr.; Centre National De La Recherche Scientifique Cnrs
SOURCE: Fr. Demande, 33 pp.
CODEN: FRXXBL
DOCUMENT TYPE: Patent
LANGUAGE: French
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

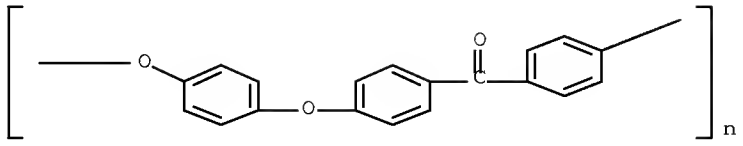
| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| FR 2877147 | A1 | 20060428 | FR 2004-11284 <-- | 200410 22 |
| FR 2877147 | B1 | 20100903 | | |
| PRIORITY APPLN. INFO.: | | | FR 2004-11284 <-- | 200410 22 |

AB The invention relates to mainly a protonic conducting membrane including a microporous structure produced starting from a proton conducting polymer and having a sufficient conductivity to ensure only the ionic conduction of the membrane. Preferentially, the pores of the microporous structure are at least partially sealed by one or more compds. of a protonic conductivity lower than that of the cited microporous structure. The invention also relates to a manufacturing process of the membrane. The invention also relates to the application of such a membrane in an electrochem. device such as a fuel cell as a proton exchange membrane or a polymeric solid electrolyte.

IT 7664-93-9, Sulfuric acid, processes
(improved proton conducting membrane, process for fabrication and application in fuel cell)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3DP, PEEK, sulfonated
(improved proton conducting membrane, process for fabrication and application in fuel cell)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



(plain and composites with zirconium phosphate; improved proton conducting membrane, process for fabrication and application in fuel cell

IPCI H01M0008-10 [I,A]; H01M0004-86 [I,A]; H01M0008-10 [I,C]; H01M0008-10 [I,A]; H01M0004-86 [I,C]; H01M0004-86 [I,A]

IPCR H01M0008-10 [I,C]; H01M0008-10 [I,A]; H01M0004-86 [I,C]; H01M0004-86 [I,A]

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 36, 38

ST proton conducting membrane fabrication fuel cell separator electrolyte polyelectrolyte; mineral pore filling proton exchange membrane sulfonated polyether polyketone

IT Solvents
(antisolvents, to induce precipitation; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polymers, uses
(aromatic, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polymers, uses
(carboxy-containing, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Membranes, nonbiological
(composite; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polybenzimidazoles
Polysulfones, uses
(composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Heteropoly acids
Oxides (inorganic), uses
Phosphates, uses
Phosphonates
(composites with proton exchange membranes; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Membranes, nonbiological
(elec. conductive; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Electric conductivity
Fuel cell electrolytes
Fuel cell separators
Ion exchange
Ion exchange membranes
Polyelectrolytes

Precipitation (chemical)
Sulfonation
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Pore
(micropore; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Microstructure
(of ion exchange membrane; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Functional groups
(phosphonate group, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyketones
Polysulfones, uses
(polyether-, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyketones
(polyether-, sulfonated, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyketones
(polyether-, sulfonation of; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyethers, uses
(polyketone-, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyethers, uses
(polyketone-, sulfonated, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyethers, processes
(polyketone-, sulfonation of; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Sulfonic acids, uses
(polymers, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polyethers, uses
(polysulfone-, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Ionic conductivity
(proton; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polymers, uses
(sulfo-containing, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT Polymers, uses
(sulfonated, composites with minerals; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 1303-86-2, Boron oxide, uses 1314-23-4, Zirconium oxide, uses 1332-29-2, Tin oxide 7631-86-9, Silicon oxide, uses 13463-67-7, Titanium oxide, uses 13765-94-1 14417-93-7, Tin phosphate 21006-68-8 53547-40-3 71851-97-3
(composites with proton exchange membranes; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 9003-39-8DP, Polyvinylpyrrolidone, salts with sulfonated PEEK
(d.p. 95.1, plain and composites with zirconium phosphate; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 9003-39-8, Polyvinylpyrrolidone
(d.p. 95.1; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 7664-93-9, Sulfuric acid, processes
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 31694-16-3, PEEK
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 31694-16-3DP, PEEK, sulfonated
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 64-17-5, Ethanol, uses
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 7732-18-5, Water, uses
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 7664-38-2, Phosphoric acid, reactions 7699-43-6, Zirconyl chloride 68926-31-8
(improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 13765-95-2P, Zirconium phosphate
(in membrane pores; improved proton conducting membrane, process for fabrication and application in fuel cell)

IT 31694-16-3DP, PEEK, sulfonated, salts with polyvinylpyrrolidone
(plain and composites with zirconium phosphate; improved proton conducting membrane, process for fabrication and application in fuel cell)

RETABLE

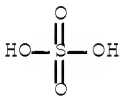
| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Alberti, G | 2003 | | | WO 03081691 A | HCA |
| Alberti, G | 2004 | 14 | 1910 | JOURNALOF MATERIALS | HCA |
| Bauer, B | 2003 | | | WO 03077340 A | HCA |
| Charnock, P | 2004 | | | US 2004005474 A1 | HCA |
| Formato, R | 1999 | | | WO 9910165 A | HCA |
| Kaliaguine, S | 2004 | | | US 6716548 B1 | HCA |
| Savadogo, O | 2004 | 127 | 135 | JOURNAL OF POWER SOU | HCA |
| Ube Industries Ltd | 2004 | | | EP 1447816 A | HCA |
| Zhang, S | 2004 | 125 | 114 | JOURNAL OF POWER SOU | HCA |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

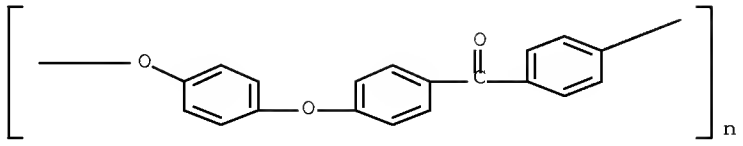
L98 ANSWER 4 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:72106 HCA Full-text
TITLE: Covalently cross-linked ionomer (blend) membranes for fuel cells
AUTHOR(S): Kerres, Jochen; Zhang, Wei; Haering, Thomas
CORPORATE SOURCE: Institute for Chemical Engineering, University of Stuttgart, Stuttgart, D-70199, Germany
SOURCE: Journal of New Materials for Electrochemical Systems (2004), 7(4), 299-309
CODEN: JMESFQ; ISSN: 1480-2422
PUBLISHER: Journal of New Materials for Electrochemical Systems
DOCUMENT TYPE: Journal
LANGUAGE: English

AB In this contribution the synthesis and characterization of novel types of covalently cross-linked blend membranes is reported. The membranes are composed of different types of sulfochlorinated poly(etherketones) and sulfinated polyethersulfone or polyetherketone arylpolymers, where the sulfinate groups were cross-linked by S-alkylation reactions with bifunctional halogeno-compds., among them α,o-diiodoalkanes or aromatic difluoro-compds. like bis(4-fluorophenyl)sulfone, bis(3-nitro-4 fluorophenyl)sulfone or bis(4-fluorophenyl)phenylphosphinoxide. After membrane formation the sulfochloride groups of the membranes were hydrolyzed by aqueous posttreatment. Transparent, morphol. homogeneous, mech. stable and highly H+-conductive ionomer membranes were obtained. To investigate the influence of different parameters onto the membrane properties, the type and the ion-exchange capacity (IEC) of sulfonated polyetherketone, the type of sulfinated polymer, the mass relation between the sulfonated polyetherketone and the sulfinated polymer, the type of cross-linker, and the crosslinking d. of the membranes has been varied systematically. The results of this work are presented in this contribution.

IT 7664-93-9, Sulfuric acid, uses
(covalently crosslinked ionomer (blend) membranes for fuel cells)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3D, PEEK, chlorosulfonated, hydrolyzed, lithium salts, polymers
(crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 38
ST ionomer membrane crosslinking fuel cell
IT Fuel cells
(PE; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Swelling, physical
Thermal stability
(covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Ionomers
Polymer blends
(covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Alkanes, uses
(diiodo-; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Aromatic compounds
(fluoro arenes; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Polysulfones, uses
(polyether-, sulfinated, crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Polyketones
(polyether-, sulfochlorinated, sulfonated, crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Polyethers, uses
(polyketone-, sulfochlorinated, sulfonated, crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT Polyethers, uses
(polysulfone-, sulfinated, crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT 68-12-2, DMF, uses 109-99-9, THF, uses 872-50-4, NMP, uses 1310-65-2, Lithium hydroxide 7664-93-9, Sulfuric acid, uses 7681-52-9, Sodium hypochlorite 7719-09-7, Thionyl chloride 7757-83-7, Sodium sulfite 7772-98-7, Sodium thiosulfate 8014-95-7, Oleum 25135-51-7D, sulfinated, hydrolyzed, salts, polymers
(covalently crosslinked ionomer (blend) membranes for fuel cells)
IT 31694-16-3, PEEK
(covalently crosslinked ionomer (blend) membranes for fuel cells)
IT 25839-81-0D, sulfinated, salts, polymers 27380-27-4D, PEK, chlorosulfonated, hydrolyzed, lithium salts, polymers 60015-05-6D, Pekekk, chlorosulfonated, hydrolyzed, lithium salts, polymers 154281-38-6D, Radel R, sulfinated, salts, polymers

(crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT 31694-16-3D, PEEK, chlorosulfonated, hydrolyzed, lithium salts, polymers
(crosslinked; covalently crosslinked ionomer (blend) membranes for fuel cells)
IT 312-30-1 383-29-9, Bis(4-fluorophenyl)sulfone 628-21-7, 1,4-Diiodobutane 54300-32-2, Bis(4-fluorophenyl)phenylphosphine oxide
(crosslinking agent; covalently crosslinked ionomer (blend) membranes for fuel cells)
RETABLE

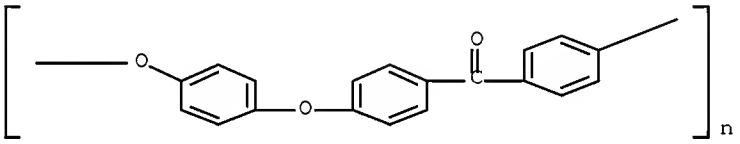
| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Guiver, M | 1987 | | | Diss, Carletown Univ | |
| Karlsson, L | 2003 | | | Diss, Lund Universit | |
| Kerres, J | 1997 | | | DE 19622337 | HCA |
| Kerres, J | 2001 | | | WO 03/022892 A2 | HCA |
| Kerres, J | 2001 | | | US 6221923 | HCA |
| Kerres, J | 2003 | | | US 6552135 | HCA |
| Kerres, J | 1997 | | | F 9706706 | |
| Kerres, J | 1998 | 139 | 227 | J Memb Sci | HCA |
| Kerres, J | 2001 | 185 | 3 | J Memb Sci | HCA |
| Kerres, J | 2000 | 3 | 229 | J New Mat Electroche | HCA |
| Kerres, J | 2002 | 5 | 97 | J New Mat Electroche | HCA |
| Kerres, J | 1998 | 36 | 1441 | J Polym Sci: Part A: | HCA |
| Lindberg, B | 1967 | 21 | 841 | Acta Chem Scand | HCA |
| Okuyama, T | 1990 | | 623 | The Chemistry of Sul | HCA |
| Okuyama, T | 1990 | | 639 | The Chemistry of Sul | HCA |
| Sato, M | 1982 | 3 | 821 | Makromol Chem Rapid | HCA |
| Ulman, A | 1989 | 54 | 4691 | J Org Chem | HCA |
| Ulrich, H | 1998 | 263 | 71 | Angew Makromol Chem | HCA |

OS.CITING REF COUNT: 8 THERE ARE 8 CAPLUS RECORDS THAT CITE THIS RECORD (8 CITINGS)

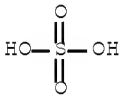
L98 ANSWER 5 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 144:54217 HCA Full-text
TITLE: Preparation and characterization of ionically cross-linked proton-conducting membranes
AUTHOR(S): Tang, C. M.; Zhang, W.; Kerres, J.
CORPORATE SOURCE: Institute for Chemical Engineering, University of Stuttgart, Stuttgart, D-70199, Germany
SOURCE: Journal of New Materials for Electrochemical Systems (2004), 7(4), 287-298
CODEN: JMESFQ; ISSN: 1480-2422
PUBLISHER: Journal of New Materials for Electrochemical Systems
DOCUMENT TYPE: Journal
LANGUAGE: English
AB In the presented work, sulfonated arylene polymers were combined with different types of aminated arylene polymers to acid-base ionomer blend membranes. The bases have been synthesized by amination of com. PSU and PEEK. Due to the PSU structure having electron-rich and electron-deficient moieties, the amino group introduction results in two aminated PSU with different properties. Amination of PEEK yields PEEKNH2. In order to increase the basicity, methylation of the amino groups has been carried out. The sulfonated polymers have been combined with the basic polymers, forming acid-

base-blend membranes, in which ionic interactions and/or hydrogen bridges were formed between the polymers. The blend membranes showed properties being dependent onto basic group-basicity and alkylation degree of the basic group: when combining a sulfonated polymer with a weak PSU base which was aminated in the electron-deficient moiety, an ion-exchange capacity (IEC) of higher than calculated was observed, leading to membranes with high swelling at elevated T. When combining the sulfonated polymer with a stronger polymeric base, a good accordance was found between theor. and exptl. IEC. The combination of the sulfonated polymers with alkylated polymeric bases led to phase-separated membranes with bad mech. properties, which is probably due to incompatibility between the two polymers because of steric hindrance of the alkylated base. When testing the membranes in a H2/O2 fuel cell, it came out that only the membranes containing the stronger basic PSU were stable up to 80°C due to sufficient ionic interaction between the blend components of this membrane type.

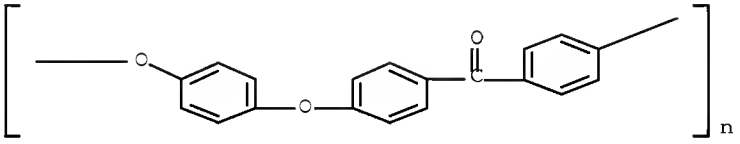
IT 31694-16-3, PEEK
(amination or sulfonation of; preparation/characterization of ionically crosslinked proton-conducting membranes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, uses
(preparation/characterization of ionically crosslinked proton-conducting membranes)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3D, PEEK, aminated and sulfonated, salts
(preparation/characterization of ionically crosslinked proton-conducting membranes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



```
CC    52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
      Section cross-reference(s): 35
ST    ionic crosslinking proton conducting membrane fuel
      cell
IT    Fuel cells
         (PE; preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    Polyketones
      Polysulfones, uses
         (polyether-, aminated, sulfonated, salts; preparation/characterization
         of ionically crosslinked proton-conducting membranes)
IT    Polyethers, uses
         (polyketone-, aminated, sulfonated, salts;
         preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    Polyethers, uses
         (polysulfone-, aminated, sulfonated, salts;
         preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    Ion exchangers
      Swelling, physical
      Thermal stability
         (preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    Polymer blends
         (preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    25135-51-7, Udel P 1800 31694-16-3, PEEK
         (amination or sulfonation of; preparation/characterization
         of ionically crosslinked proton-conducting membranes)
IT    68-12-2, DMF, uses   74-88-4, Methyliodide, uses   109-72-8, n-Butyl
      lithium, uses   109-99-9, THF, uses   121-44-8, Triethylamine, uses
      127-19-5   872-50-4, NMP, uses   941-55-9, Tosylazide   1310-58-3,
      Potassium hydroxide, uses   1333-74-0, Hydrogen, uses   7440-37-1,
      Argon, uses 7664-93-9, Sulfuric acid, uses   7697-37-2,
      Nitric acid, uses   7772-98-7, Sodium thiosulfate   7782-44-7,
      Oxygen, uses   7791-25-5, Sulfonyl chloride   16940-66-2, Sodium
      borohydride
         (preparation/characterization of ionically crosslinked
         proton-conducting membranes)
IT    25135-51-7D, Udel P 1800, aminated and sulfonated, salts
      31694-16-3D, PEEK, aminated and sulfonated, salts
         (preparation/characterization of ionically crosslinked
         proton-conducting membranes)
RETABLE
   Referenced Author   |Year | VOL | PG   | Referenced Work    |
Referenced
         (RAU)         |(RPY)|(RVL)|(RPG) |      (RWK)         | File
======================+=====+=====+======+====================+=========
==
Arnold, C              |1987 |38   |71    |J Membr Sci         |
Gunther, H             |1992 |     |      |NMR-spektroskopie, 3|
Hesse, M               |1991 |     |      |Spektroskopische Met|
Hummel/Scholl          |1988 |2    |      |Atlas of Polymer and|
Jin, X                 |1985 |17   |4     |Br Polym J          |HCA
Kerres, J              |1998 |139  |211   |J Membr Sci         |HCA
Kerres, J              |1996 |34   |2421  |J Polym Sci, Part A |HCA
Kerres, J              |1998 |36   |1441  |J Polymer Sci: Part |HCA
```

| | | | | | |
|---|---|---|---|---|---|
| Kerres, J | 1998 | 14 | 145 | Sep and Purification | |
| Kesting, R | 1985 | | | Synthetic Polymeric | |
| Nabe, A | 1997 | 133 | 57 | J Membr Sci | |
| Nolte, R | 1993 | 83 | 211 | J Membr Sci | HCA |
| Noshay, A | 1976 | 20 | 1885 | J Appl Polym Sci | HCA |
| Pozniak, G | 1995 | 233 | 23 | Die Angew Makr Chem | HCA |
| Seymour, R | 1984 | | | Structure-Property R | |

OS.CITING REF COUNT: 6 THERE ARE 6 CAPLUS RECORDS THAT CITE THIS RECORD (6 CITINGS)

L98 ANSWER 6 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:300971 HCA Full-text
TITLE: Ion exchange composite material based on proton conductive functionalized inorganic support compounds in a polymer matrix
INVENTOR(S): St.-Arnaud, Marc; Bebin, Philippe
PATENT ASSIGNEE(S): Can.
SOURCE: U.S. Pat. Appl. Publ., 20 pp., Cont.-in-part of Appl. No. PCT/CA03/00435.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| US 20050053818 | A1 | 20050310 | US 2004-949022 | 20040924 |
| | | | <-- | |
| WO 2003083985 | A2 | 20031009 | WO 2003-CA435 | 20030326 |
| | | | <-- | |
| WO 2003083985 | A3 | 20041216 | | |
| W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW | | | | |
| RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG | | | | |
| CA 2494430 | A1 | 20060324 | CA 2005-2494430 | 200501 26 |
| | | | <-- | |
| EP 1646097 | A2 | 20060412 | EP 2005-20419 | 200509 20 |
| | | | <-- | |
| EP 1646097 | A3 | 20081001 | | |
| EP 1646097 | B1 | 20100804 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, | | | | |

PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK, BA, HR, IS, YU

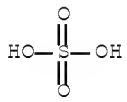
| | | | | |
|---|---|---|---|---|
| AT 476761 | T | 20100815 | AT 2005-20419 | 200509 20 |
| | | | <-- | |
| PRIORITY APPLN. INFO.: | | | US 2002-367771P | P 200203 28 |
| | | | <-- | |
| | | | WO 2003-CA435 | A2 200303 26 |
| | | | <-- | |
| | | | US 2004-949022 | A 200409 24 |
| | | | <-- | |

AB The composite material comprises acid functionalized inorg. supports such as silica dispersed in a functionalized and/or non-functionalized polymer matrix that is based on numerous polymers such as poly(aromatic ether ketones), or poly(benzoyl phenylene), or derivs. thereof. The composite material is characterized by good water retention capabilities due to the acidic functions and the hydrophilicity of the silica particles. Moreover, a good impermeability to gas and liquid fuels commonly used in fuel cell technol., like hydrogen gas or methanol solution, is also obtained due to the presence of silica particles. Good mech. properties of the composite material let the material to be formed easily in thin film or membrane form. In that form, the composite material is usable for proton exchange membrane for fuel cells, for drying or humidifying membrane for gas or solvent conditioning, or as acid catalytic membrane.

IT 7664-93-9, Sulfuric acid, processes
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

RN 7664-93-9 HCA

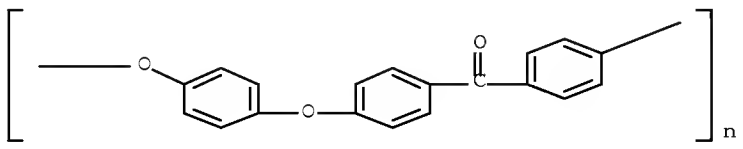
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3D, PEEK, sulfonated
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



INCL 429030000; 429033000; 429046000; 204296000; 429044000; 429041000
IPCI H01M0008-10 [ICM,7]; H01M0004-86 [ICS,7]; H01M0004-90 [ICS,7];
H01M0004-96 [ICS,7]; H01M0008-08 [ICS,7]; H01M0008-14 [ICS,7];
C25B0013-00 [ICS,7]; C25C0007-04 [ICS,7]; C25C0007-00 [ICS,7,C*]
IPCR C25B0013-00 [I,C*]; C25B0013-00 [I,A]; C25C0007-00 [I,C*];
C25C0007-04 [I,A]; H01M0004-86 [I,C*]; H01M0004-86 [I,A];
H01M0004-90 [I,C*]; H01M0004-90 [I,A]; H01M0004-96 [I,C*];
H01M0004-96 [I,A]; H01M0008-08 [I,C*]; H01M0008-08 [I,A];
H01M0008-10 [I,C*]; H01M0008-10 [I,A]; H01M0008-14 [I,C*];
H01M0008-14 [I,A]
NCL 429/431.000; 204/296.000; 429/493.000; 429/516.000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 48, 56, 61, 72
ST fuel cell composite inorg compd polymer matrix
IT Membranes, nonbiological
(catalytic, acid; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Membranes, nonbiological
(desalination; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Air conditioning
Composites
Ion exchangers
Liquid crystals, polymeric
Sulfonation
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Separation
(membranes; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT Fuel cells
(proton exchange membrane; ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT 110-86-1, Pyridine, processes 302-04-5, Thiocyanate, processes 420-04-2, Cyanamide 661-20-1, Isocyanate 7664-38-2, Phosphoric acid, processes 7664-93-9, Sulfuric acid, processes 7803-51-2, Phosphine 13598-36-2, Phosphonic acid 13840-40-9, Phosphine oxide 14265-44-2, Phosphate, processes 15477-76-6, Phosphonate 32323-01-6, Imide
(ion exchange composite material based on proton conductive functionalized inorg. support compds. in polymer matrix)
IT 1314-23-4, Zirconium oxide, uses 1344-28-1, Alumina, uses 7631-86-9D, Silica, acid functionalized 7631-86-9D, Silica, carboxylic acid functionalized 7631-86-9D, Silica, phosphonic acid functionalized 7631-86-9D, Silica, propylamine-functionalized 7631-86-9D, Silica, sulfonic acid functionalized 9002-84-0, Ptfe 9002-86-2, Polyvinyl chloride 9002-88-4, Polyethylene 9003-07-0, Polypropylene 9003-53-6, POlystyrene 9003-56-9, Acrylonitrile-butadiene-styrene copolymer 9004-34-6, Cellulose, uses 13463-67-7, Titanium oxide, uses 24937-78-8, Ethylene-vinyl acetate copolymer 31694-16-3, Peek 31694-16-3D, PEEK, sulfonated 52352-27-9 150385-13-0, Poly(benzoyl-1,4-phenylene) 223537-84-6
(ion exchange composite material based on proton conductive

functionalized inorg. support compds. in polymer matrix)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

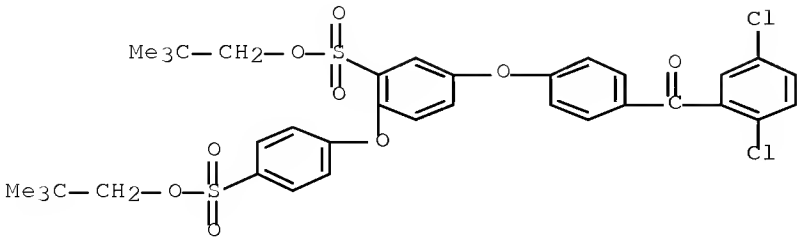
L98 ANSWER 7 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:41476 HCA Full-text
TITLE: Aromatic sulfonate ester derivatives, polyarylenes, sulfo-containing polyarylenes and their manufacture, and polymer solid electrolytes and proton-conducting membranes for fuel cells
INVENTOR(S): Yamakawa, Yoshitaka; Kadota, Toshiaki; Rojanski, Igor; Goto, Kohei
PATENT ASSIGNEE(S): JSR Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 29 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2004346163 | A | 20041209 | JP 2003-143904 | 200305 21 |
| | | | <-- | |
| JP 4193581 | B2 | 20081210 | | |
| PRIORITY APPLN. INFO.: | | | JP 2003-143904 | 200305 21 |
| | | | <-- | |

OTHER SOURCE(S): MARPAT 142:41476
AB The ester derivs. are represented by C6X2H3A(C6H4B)m[C6(SO3Ra)kH4-k]nAr [X = halo excluding F, OSO3Me, OSO3CF3; A = divalent organic; B = A, direct bond; Ra = C4-20 hydrocarbyl; Ar = SO3Rb (Rb = Ra)-substituted aromatic; when n = 0, Ar = Ph; m, n = 0-10; m + n ≥ 1; k = 1-4]. The polyarylenes have aromatic repeating units including X-free residues of the above derivs. The sulfo-containing polyarylenes are manufactured by coupling-polymerization of aromatic compds. containing the ester derivs. and hydrolysis of the resulting polyarylenes. The electrolytes are made of the sulfo-containing polyarylenes and contained in the title membranes. Sulfonating agents are not used in manufacture of the sulfo-containing polyarylenes to reduce load in recovering the polymers, and introduction amount and position of sulfo group in the polymers are easily controlled.
IT 663920-37-4P
(aromatic sulfonate ester derivs. forming polyarylenes used in manufacture of sulfo-containing polyarylenes for polymer solid electrolytes and proton-conducting membranes for fuel cells)
RN 663920-37-4 HCA
CN Benzenesulfonic acid, 5-[4-(2,5-dichlorobenzoyl)phenoxy]-2-[4-[(2,2-dimethylpropoxy)sulfonyl]phenoxy]-, 2,2-dimethylpropyl ester, polymer with bis(4-chlorophenyl)methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

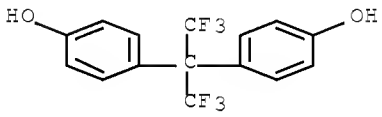
CM 1

CRN 663920-36-3
CMF C35 H36 Cl2 O9 S2



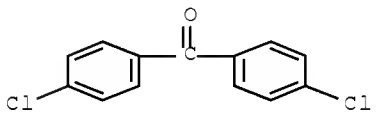
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O

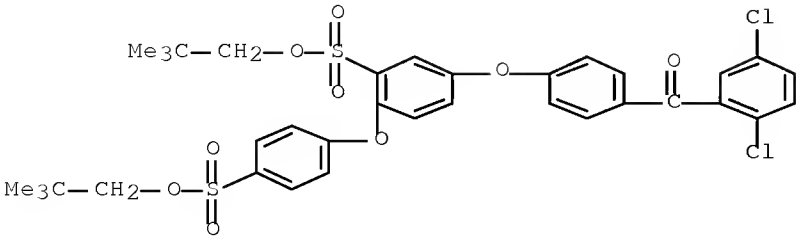


IT 663920-37-4DP, hydrolyzed
(aromatic sulfonate ester derivs. forming polyarylenes used in manufacture of sulfo-containing polyarylenes for polymer solid electrolytes and proton-conducting membranes for fuel cells)
RN 663920-37-4 HCA
CN Benzenesulfonic acid, 5-[4-(2,5-dichlorobenzoyl)phenoxy]-2-[4-[(2,2-dimethylpropoxy)sulfonyl]phenoxy]-, 2,2-dimethylpropyl ester, polymer with bis(4-chlorophenyl)methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

CM 1

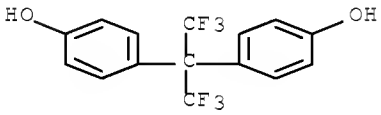
CRN 663920-36-3

CMF C35 H36 Cl2 O9 S2



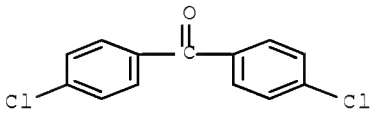
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



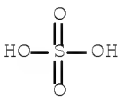
CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IT 7664-93-9D, Sulfuric acid, sulfonate derivs.
(aromatic sulfonate ester derivs. forming polyarylenes used in manufacture of sulfo-containing polyarylenes for polymer solid electrolytes and proton-conducting membranes for fuel cells)

RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IPCI C08G0061-10 [I,A]; C08G0061-00 [I,C*]; C07C0309-75 [I,A];
C07C0309-00 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,A]
IPCR C07C0309-00 [I,C*]; C07C0309-75 [I,A]; C08G0061-00 [I,C*];
C08G0061-10 [I,A]; H01M0008-02 [I,A]; H01M0008-02 [I,C*];
H01M0008-10 [I,A]; H01M0008-10 [I,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 37, 38
ST fuel cell proton conducting membrane
polymer electrolyte; arom sulfonate ester deriv sulfo polyarylene
manuf; sulfo polyarylene manuf polymer electrolyte fuel
cell
IT Fuel cell electrolytes
Ionic conductors
Polymer electrolytes
(aromatic sulfonate ester derivs. forming polyarylenes used in
manufacture of sulfo-containing polyarylenes for polymer solid
electrolytes and proton-conducting membranes for
fuel cells)
IT Sulfonic acids, preparation
(esters, derivs.; aromatic sulfonate ester derivs. forming
polyarylenes used in manufacture of sulfo-containing polyarylenes for
polymer solid electrolytes and proton-conducting
membranes for fuel cells)
IT Polyketones
(polyether-, fluorine-containing, polyarylene-, sulfo-containing; aromatic
sulfonate ester derivs. forming polyarylenes used in manufacture of
sulfo-containing polyarylenes for polymer solid electrolytes and
proton-conducting membranes for fuel
cells)
IT Fluoropolymers, uses
(polyether-polyketone-, polyarylene-, sulfo-containing; aromatic
sulfonate ester derivs. forming polyarylenes used in manufacture of
sulfo-containing polyarylenes for polymer solid electrolytes and
proton-conducting membranes for fuel
cells)
IT Polyethers, uses
(polyketone-, fluorine-containing, polyarylene-, sulfo-containing; aromatic
sulfonate ester derivs. forming polyarylenes used in manufacture of
sulfo-containing polyarylenes for polymer solid electrolytes and
proton-conducting membranes for fuel
cells)
IT Hydrolysis
(sulfo-containing polyarylenes manufactured by; aromatic sulfonate ester
derivs. forming polyarylenes used in manufacture of sulfo-containing
polyarylenes for polymer solid electrolytes and proton-conducting
membranes for fuel cells)
IT 663920-34-1DP, sulfonate derivs. 663920-35-2DP, sulfonate derivs.
663920-37-4P 803733-72-4DP, sulfonate derivs.
(aromatic sulfonate ester derivs. forming polyarylenes
used in manufacture of sulfo-containing polyarylenes for polymer solid
electrolytes and proton-conducting membranes for
fuel cells)
IT 663920-37-4DP, hydrolyzed
(aromatic sulfonate ester derivs. forming polyarylenes
used in manufacture of sulfo-containing polyarylenes for polymer solid
electrolytes and proton-conducting membranes for
fuel cells)
IT 75-84-3D, Neopentyl alcohol, sulfonate derivs. 831-82-3D,
4-Phenoxyphenol, sulfonate derivs. 1310-58-3D, Potassium
hydroxide, sulfonate derivs. 7664-93-9D, Sulfuric acid,

sulfonate derivs. 10025-87-3D, Phosphoryl chloride, sulfonate derivs. 270903-87-2D, 2,5-Dichloro-4'-fluorobenzophenone, sulfonate derivs.
(aromatic sulfonate ester derivs. forming polyarylenes used in manufacture of sulfo-containing polyarylenes for polymer solid electrolytes and proton-conducting membranes for fuel cells)

IT 663920-36-3P
(monomer; aromatic sulfonate ester derivs. forming polyarylenes used in manufacture of sulfo-containing polyarylenes for polymer solid electrolytes and proton-conducting membranes for fuel cells)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L98 ANSWER 8 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:41311 HCA Full-text
TITLE: Synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymerization
AUTHOR(S): Roy, Abhishek; Einsla, Brian R.; Harrison, William L.; McGrath, James E.
CORPORATE SOURCE: Department of Chemistry, Virginia Polytechnic Institute and State University, Blacksburg, VA, 24061, USA
SOURCE: Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry ( 2004), 49(2), 614-615
CODEN: PSADFZ; ISSN: 1521-4648
PUBLISHER: American Chemical Society, Division of Fuel Chemistry
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English

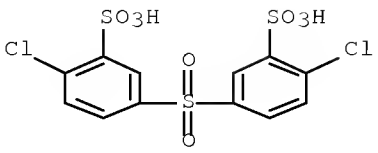
AB The authors report the synthesis of sulfonated poly(arylene ether sulfone)S based on bisphenol and hydroquinone and related systems by direct copolymn. with a sulfonated monomer. The ion exchange capacity, intrinsic viscosity, water sorption capacity, and proton conductivity increase with the degree of sulfonation. The salt form of the copolymers have increased thermo-oxidative stability relative to the acid form, and this stability decreases with sulfonation level.

IT 515144-67-9DP, proton exchanged
(synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)

RN 515144-67-9 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, sodium salt (1:2), polymer with 1,4-benzenediol and 1,1'-sulfonylbis[4-chlorobenzene] (CA INDEX NAME)

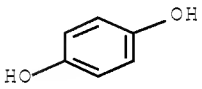
CM 1

CRN 51698-33-0
CMF C12 H8 Cl2 O8 S3 . 2 Na



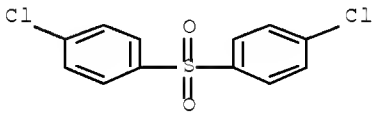
CM 2

CRN 123-31-9
CMF C6 H6 O2

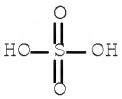


CM 3

CRN 80-07-9
CMF C12 H8 Cl2 O2 S



IT 7664-93-9, Sulfuric acid, reactions
(synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 76
ST hydroquinone disulfonated poly arylene ether sulfone copolymn membrane; proton exchange membrane cond copolymer sulfonated polyarylene ether sulfone
IT Fuel cells

(membranes for; synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)

IT Ion exchange membranes
(synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)

IT 515144-67-9DP, proton exchanged
(synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)

IT 7664-93-9, Sulfuric acid, reactions
(synthesis and characterization of hydroquinone based disulfonated poly (arylene ether sulfone)s via direct copolymn.)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Harrson, W | 2003 | 41 | 2264 | Journal of Polymer S | |
| Kim, Y | 2003 | 41 | 2816 | Journal of Polymer S | HCA |
| Wang, F | 2002 | 197 | 231 | Journal of Membrane | HCA |

OS.CITING REF COUNT: 4 THERE ARE 4 CAPLUS RECORDS THAT CITE THIS RECORD (4 CITINGS)

L98 ANSWER 9 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:226017 HCA Full-text
TITLE: Production of sulfonated polyaryletherketones as proton exchangers for fuel cells
INVENTOR(S): Moehwald, Helmut; Fischer, Andreas; Frambach, Klaus; Hennig, Ingolf; Thate, Sven
PATENT ASSIGNEE(S): BASF Ag, Germany
SOURCE: Ger. Offen., 16 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| DE 10309135 | A1 | 20040909 | DE 2003-10309135 | 20030228 |
| | | | <-- | |
| CA 2514946 | A1 | 20040910 | CA 2004-2514946 | 20040227 |
| | | | <-- | |
| WO 2004076530 | A1 | 20040910 | WO 2004-EP1975 | 20040227 |
| | | | <-- | |

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI

RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

| | | | | |
|---|---|---|---|---|
| EP 1599530 | A1 | 20051130 | EP 2004-715287 | 200402 27 <-- |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK | | | | |
| CN 1753932 | A | 20060329 | CN 2004-80005401 | 200402 27 <-- |
| CN 100357339 | C | 20071226 | | |
| JP 2006519268 | T | 20060824 | JP 2006-500042 | 200402 27 <-- |
| JP 4383443 | B2 | 20091216 | | |
| US 20070117958 | A1 | 20070524 | US 2005-545084 | 200508 09 <-- |
| PRIORITY APPLN. INFO.: | | | DE 2003-10309135 A | 200302 28 <-- |
| | | | WO 2004-EP1975 W | 200402 27 <-- |

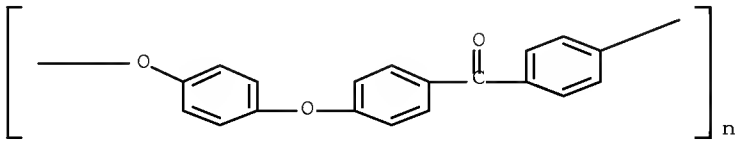
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB A sulfonated polyaryletherketone is produced by reacting at least one polyaryletherketone with at least one alkanesulfonic acid to provide a sulfur-containing polyaryletherketone. The process optionally comprises a step of reacting the sulfur-containing polyaryletherketone with at least one sulfonating agent to provide a sulfonated polyaryletherketone. The sulfonated polyether-polyketones may be used as proton exchangers/membranes in fuel cells. Thus, a polyaryletherketone (Victrex 450P) was treated with a solution of methanesulfonic acid at 45° overnight to obtain a polyaryletherketone containing 1.2% of sulfur, followed by reacting with oleum (25% of SO3) at 45° for 4 h 15 min to obtain a sulfonated polyaryletherketone containing 5% of sulfur and having a sulfonation degree of 51.4%.

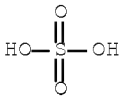
IT 31694-16-3DP, sulfonated
(Victrex 150P and Victrex 450P; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IPCI C08G0008-28 [ICM,7]; C08G0008-00 [ICM,7,C*]; B01D0071-72 [ICS,7]; B01D0071-00 [ICS,7,C*]; H01M0008-02 [ICS,7]
IPCR B01D0071-00 [I,C*]; B01D0071-52 [I,A]; B01D0071-82 [I,A]; C08G0065-00 [I,C*]; C08G0065-48 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 35-8 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 37, 52
ST sulfonated polyaryletherketone proton exchanger fuel cell membrane
IT Ion exchangers
(acidic; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Sulfonic acids, reactions
(alkanesulfonic; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polyketones
(polyether-, aromatic, sulfonated; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polysulfones, uses
(polyether-; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polyethers, preparation
(polyketone-, aromatic, sulfonated; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polyethers, uses
(polysulfone-; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Fuel cell separators
Fuel cells
(production of sulfonated polyaryletherketones as proton exchangers for)
IT Polyelectrolytes
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polysulfones, uses
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Polymer blends
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT Plastics, uses
(thermoplastics; production of sulfonated polyaryletherketones as

proton exchangers for fuel cells)
IT 31694-16-3DP, sulfonated
(Victrex 150P and Victrex 450P; production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT 39317-73-2DP, Denacol EX 313, reaction products with sulfonated polyether-polyketones
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT 25667-42-9, Ultrason E 6020P
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
IT 75-75-2, Methanesulfonic acid 7664-93-9, Sulfuric acid, reactions 8014-95-7, Oleum
(production of sulfonated polyaryletherketones as proton exchangers for fuel cells)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

L98 ANSWER 10 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 141:210126 HCA Full-text
TITLE: Manufacturing process for membrane-electrode assemblies
INVENTOR(S): Masaka, Fusazumi; Kita, Kiyonori; Hama, Yuichiro; Iguchi, Masaru; Mitsuta, Naoki; Yano, Junichi
PATENT ASSIGNEE(S): JSR Corporation and Honda Motor Co., Ltd., Japan; Honda Motor Co., Ltd.
SOURCE: U.S. Pat. Appl. Publ., 13 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| US 20040163760 | A1 | 20040826 | US 2004-773317 | 20040209 |
| | | | <-- | |
| US 7396607 | B2 | 20080708 | | |
| JP 2004253267 | A | 20040909 | JP 2003-42966 | 20030220 |
| | | | <-- | |
| JP 4068988 | B2 | 20080326 | | |
| KR 2004075748 | A | 20040830 | KR 2004-10949 | 20040219 |
| | | | <-- | |
| EP 1482589 | A2 | 20041201 | EP 2004-3826 | 20040219 |
| | | | <-- | |
| EP 1482589 | A3 | 20051228 | | |
| EP 1482589 | B1 | 20090218 | | |

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,

SK

PRIORITY APPLN. INFO.: JP 2003-42966 A 200302 20

<--

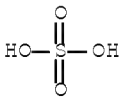
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention provides a manufacturing process for MEA that enables sufficient bond strength among an electrolyte membrane and electrode substrates even when the electrolyte membrane comprises a heat-resistant material such as an aromatic polymer. The process comprises pressure bonding an electrolyte membrane with catalyzed electrode substrates to form a membrane-electrode assembly, wherein a good solvent for the electrolyte membrane is applied to at least one of facing surfaces of the opposed electrode substrate and the electrolyte membrane prior to the pressure bonding. The electrolyte membrane may comprise a sulfonated aromatic polymer. The good solvent for the electrolyte membrane may be an aprotic dipolar solvent.

IT 7664-93-9, Sulfuric acid, processes
(manufacturing process for membrane-electrode assemblies)

RN 7664-93-9 HCA

CN Sulfuric acid (CA INDEX NAME)



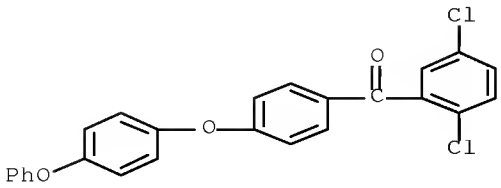
IT 463963-71-5DP, 2,2-Bis(4-hydroxyphenyl)-1,1,1,3,3,3-hexafluoropropane-4,4'-dichloro benzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated
(manufacturing process for membrane-electrode assemblies)

RN 463963-71-5 HCA

CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

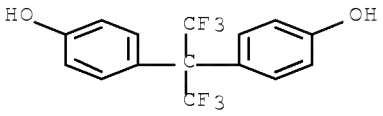
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



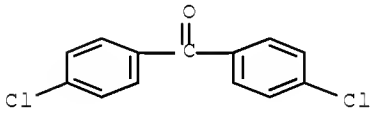
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



INCL 156305000
IPCI H01M0004-00 [I,A]
IPCR H01M0008-02 [I,C*]; H01M0008-02 [I,A]; C08J0005-12 [I,C*];
C08J0005-12 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A];
H01M0004-00 [I,C]; H01M0004-00 [I,A]; H01M0010-36 [I,C*];
H01M0010-40 [I,A]
NCL 156/305.000; 429/535.000; 429/483.000; 429/493.000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72
ST membrane electrode assembly manuf process;
fuel cell membrane electrode
assembly manuf process
IT Sulfonic acids
(arenesulfonic, polymers; manufacturing process for membrane-
electrode assemblies)
IT Polymers
(aromatic, sulfonated; manufacturing process for membrane-
electrode assemblies)
IT Electrochemical cells
Fuel cell electrodes
Fuel cell electrolytes
(manufacturing process for membrane-electrode
assemblies)
IT 872-50-4, n-Methyl-2-pyrrolidone, uses
(manufacturing process for membrane-electrode
assemblies)
IT 7664-93-9, Sulfuric acid, processes
(manufacturing process for membrane-electrode
assemblies)
IT 122325-09-1P, Bisphenol AF-4,4'-dichlorobenzophenone copolymer
463963-71-5DP, 2,2-Bis(4-hydroxyphenyl)-1,1,1,3,3,3-
hexafluoropropane-4,4'-dichloro
benzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone

copolymer, sulfonated
(manufacturing process for membrane-electrode assemblies)
IT 67-68-5, Dmso, uses 127-19-5, n,n-Dimethylacetamide
(manufacturing process for membrane-electrode assemblies)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Anon | 1996 | | | EP 0718903 A1 | HCA |
| Anon | 2000 | | | WO 0045448 | HCA |
| Anon | 2001 | | | WO 0165623 | HCA |
| Anon | 2002 | | | JP 2002075407 | HCA |
| Anon | 2002 | | | JP 2002298869 | HCA |
| Anon | 2002 | | | JP 2002298870 | HCA |
| Bonsel | 2001 | | | US 6197147 B1 | |
| Nanaumi | 2002 | | | US 20020155340 A1 | HCA |
| Sansone | 2001 | | | US 6187231 B1 | |
| Sompalli | 2003 | | | US 6524736 B1 | HCA |
| Tabata | 2002 | | | US 20020071980 A1 | HCA |
| Yamakawa | 2003 | | | US 20030173547 A1 | HCA |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

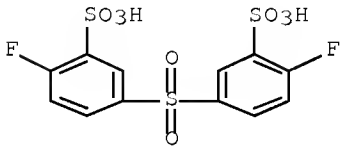
L98 ANSWER 11 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:409513 HCA Full-text
TITLE: Synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications
AUTHOR(S): Dang, Thuy D.; Bai, Zongwu; Dalton, Matthew J.; Fossum, Eric
CORPORATE SOURCE: AFRL/MLBP, Materials and Manufacturing Directorate, Wright-Patterson Air Force Base, OH, 45433, USA
SOURCE: Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2004), 45(1), 22-23
CODEN: ACPPAY; ISSN: 0032-3934
PUBLISHER: American Chemical Society, Division of Polymer Chemistry
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English
AB The development of new polymer electrolyte membranes has been necessitated by the fact that com. Nafion membranes do not meet the requirements for high temperature (>120 °C) fuel cell operation. In this paper, the synthesis and characterization of highly sulfonated polyarylenethioethersulfone are described. The polymer backbone is wholly aromatic, bulky aromatic end-caps, and there is high sulfuric acid content to enhance water retention and potential applicability for high temperature (>120 °C) fuel cells applications. Proton conductivities, solubilities in water and various solvents, mol. weight, intrinsic viscosity, and film properties were measured of polymers in the salt and also acid form, both uncapped and capped. The proton conductivity of polymers is at least three times higher than that of the state-of-the-art Nafion-H proton exchange membrane under nearly comparable conditions, indicating that these polymers are promising candidates for PEMs in fuel cells.
IT 689262-96-2DP, endcapped with phenyl-based monohalides

689263-01-2DP, reaction products with phenyl-based monohalides
(acid form; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

RN 689262-96-2 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

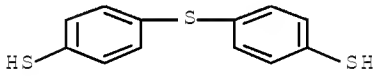
CRN 301155-59-9
CMF C12 H8 F2 O8 S3 . 2 Na



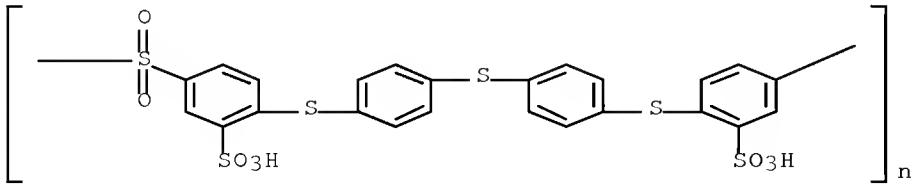
●2 Na

CM 2

CRN 19362-77-7
CMF C12 H10 S3



RN 689263-01-2 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene) sodium salt (1:2)] (CA INDEX NAME)



●2 Na

IT 689262-96-2P 689262-99-5DP, reaction products with phenyl-based monohalides 689263-01-2P

(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

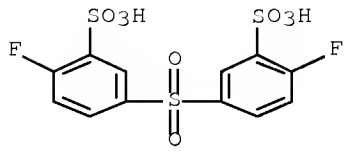
RN 689262-96-2 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

CRN 301155-59-9

CMF C12 H8 F2 O8 S3 . 2 Na

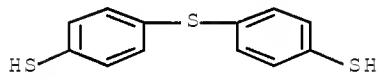


●2 Na

CM 2

CRN 19362-77-7

CMF C12 H10 S3



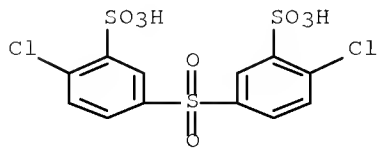
RN 689262-99-5 HCA

CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, sodium salt (1:2), polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

CM 1

CRN 51698-33-0

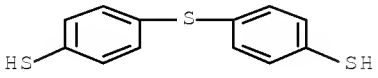
CMF C12 H8 Cl2 O8 S3 . 2 Na



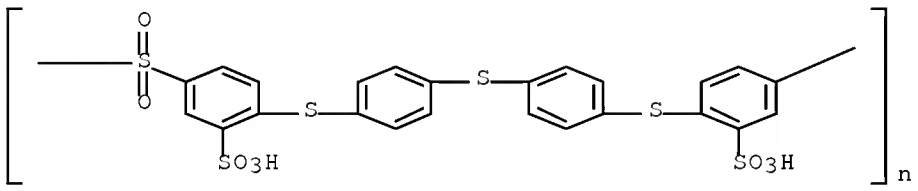
●2 Na

CM 2

CRN 19362-77-7
CMF C12 H10 S3

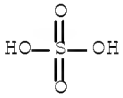


RN 689263-01-2 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene) sodium salt (1:2)] (CA INDEX NAME)



●2 Na

IT 7664-93-9, Sulfuric acid, reactions
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 76
ST sulfonated poly arylenethioether sulfone fuel cell separator proton cond
IT Membranes, nonbiological
(elec. conductive; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Fuel cell separators
(new materials for; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)
IT Polysulfones, preparation
(polyarylene-polyether-; synthesis and characterization of highly

sulfonated polyarylenethioethersulfones for fuel cell applications)

IT Polyethers, preparation
(polyarylene-polysulfone-; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT Polythioethers
(polysulfone-, aromatic; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT Polysulfones, preparation
(polythioether-, aromatic; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 689262-96-2DP, endcapped with phenyl-based monohalides
689263-01-2DP, reaction products with phenyl-based monohalides
(acid form; synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 584-08-7, Potassium carbonate
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 126-33-0, Sulfolane
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 689262-96-2P 689262-99-5DP, reaction products with phenyl-based monohalides 689263-01-2P
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 64-19-7, Acetic acid, reactions 80-07-9, 4-Chlorophenyl sulfone 134-85-0, 4-Chlorobenzophenone 345-83-5, 4-Fluorobenzophenone 383-29-9, 4-Fluorophenyl sulfone 1310-73-2, Sodium hydroxide, reactions 7647-14-5, Sodium chloride, reactions 7664-93-9, Sulfuric acid, reactions 19362-77-7, 4,4'-Thiobisbenzenethiol 51698-33-0
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

IT 301155-59-9P
(synthesis and characterization of highly sulfonated polyarylenethioethersulfones for fuel cell applications)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Dang, T | 2003 | 89 | 508 | ACS National Meeting | HCA |
| Dimitrova, P | 2002 | 150 | 115 | Solid State Ionics | HCA |
| Matsumura, S | 2001 | 34 | 2848 | Macromolecules | HCA |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Schechter, A | 2002 | 147 | 1815 | Solid State Ionics | |
| Wainright, J | 1995 | 142 | L121 | J Electrochem Soc | HCA |
| Wang, F | 2002 | 197 | 231 | Journal of Membrane | HCA |
| Wang, J | 1996 | 41 | 193 | Electrochimica Acta | HCA |

Wiles, K |2002 |43 |993 |ACS National Meeting|HCA
Zawodzinski, T |1991 |95 |6040 |Phys Chem |HCA
OS.CITING REF COUNT: 9 THERE ARE 9 CAPLUS RECORDS THAT CITE THIS RECORD (9 CITINGS)

L98 ANSWER 12 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:393325 HCA Full-text
TITLE: Properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells
AUTHOR(S): Bai, Zongwu; Williams, Larry D.; Durstock, Michael F.; Dang, Thuy D.
CORPORATE SOURCE: University of Dayton Research Institute, Dayton, OH, 45469, USA
SOURCE: Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2004), 45(1), 60-61
CODEN: ACPPAY; ISSN: 0032-3934
PUBLISHER: American Chemical Society, Division of Polymer Chemistry
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English

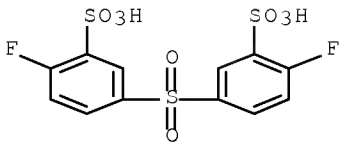
AB The Nafion-type membranes do not meet all of the requirements of proton exchange membranes (PEMs) for fuel cell operations, and the unique hydration capabilities, mech. integrity, and high thermal and oxidative stabilities, can further be improved for high temperature PEMs. The authors developed a material with an all aromatic polymer backbone with a high sulfonic acid content. The end-capped sulfonated polyarylenethioether sulfone polymers maintained high conductivity, and exhibited enhanced water resistance. This paper describes processing and characterization of films. Proton conductivity measurements were at 65X, 85% RH, and are about 4 times larger than Nafion 117 at the same conditions 0.08 S/cm. Higher mol. weight polymers proton conductivity of 0.420 S/cm vs. 0.30 S/cm for the low MW polymers. Endcapping a high MW sample with benzoxazole groups lowered the conductivity back to 0.30 S/cm, while end-capping with benzophenone raised the conductivity of a relatively low MW sample to 0.36 S/cm. Lowered humidity lowered the conductivity, with values comparable to Nafion 117 achieved at about 50%-60% RH. Impedance plots show the uncapped polymers behave as simple resistors, with phase angle about 0°. Endcapping also made the polymers insol. in water and methanol, whereas the uncapped polymers were soluble in water and methanol. All films were tough and transparent, with more flexibility in the low MW sample, as would be expected.

IT 686768-99-0P, 3,3'-Disulfonated -4,4'-difluorodiphenyl sulfone-4,4'-thiobisbenzenthiol alternating copolymer 686769-00-6P 686769-01-7DP, end-capped with benzophenone 686769-02-8P 686769-03-9P 686769-04-0P 686769-05-1P
(properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)

RN 686768-99-0 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-fluoro-, polymer with 4,4'-thiobis[benzenethiol] (9CI) (CA INDEX NAME)

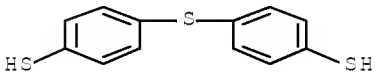
CM 1

CRN 474242-18-7
CMF C12 H8 F2 O8 S3



CM 2

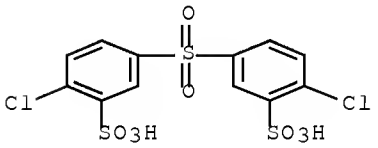
CRN 19362-77-7
CMF C12 H10 S3



RN 686769-00-6 HCA
CN Benzenesulfonic acid, 3,3'-sulfonylbis[6-chloro-, polymer with 4,4'-thiobis[benzenethiol] (CA INDEX NAME)

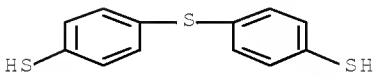
CM 1

CRN 57570-28-2
CMF C12 H8 Cl2 O8 S3

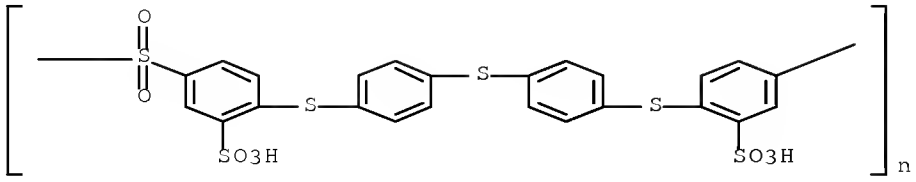


CM 2

CRN 19362-77-7
CMF C12 H10 S3

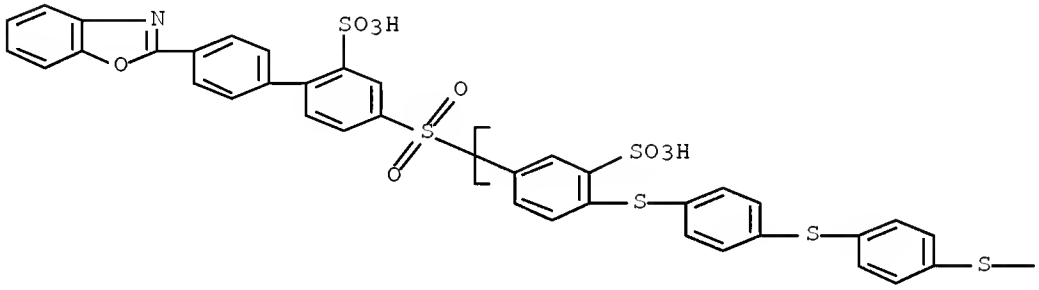


RN 686769-01-7 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene)] (CA INDEX NAME)

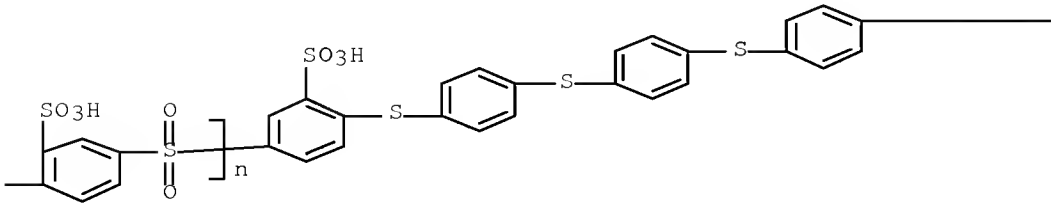


RN 686769-02-8 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene)], α-[4-[[4-[[4-[[4-(2-benzoxazolyl)phenyl]thio]phenyl]thio]phenyl]thio]-3-sulfophenyl]-ω-[[4'-(2-benzoxazolyl)-2-sulfo[1,1'-biphenyl]-4-yl]sulfonyl]- (9CI) (CA INDEX NAME)

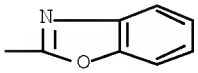
PAGE 1-A



PAGE 1-B

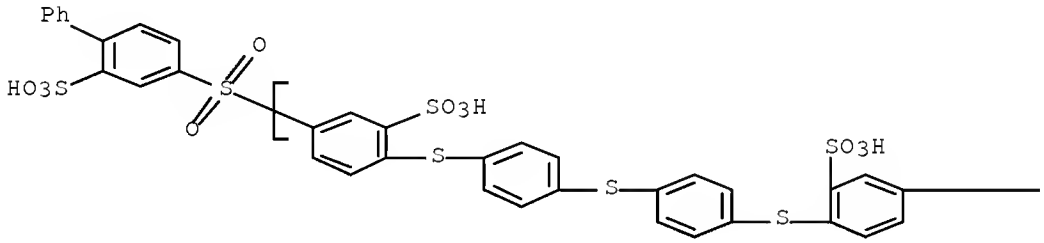


PAGE 1-C

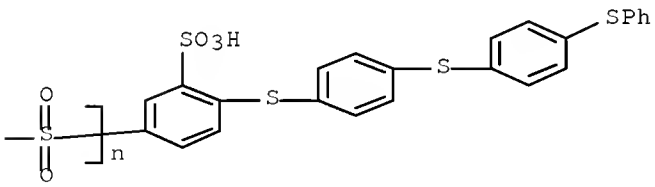


RN 686769-03-9 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene)], α-[4-[[4-[[4-(phenylthio)phenyl]thio]phenyl]thio]-3-sulfophenyl]-ω-[(3-sulfo[1,1'-biphenyl]-4-yl)sulfonyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

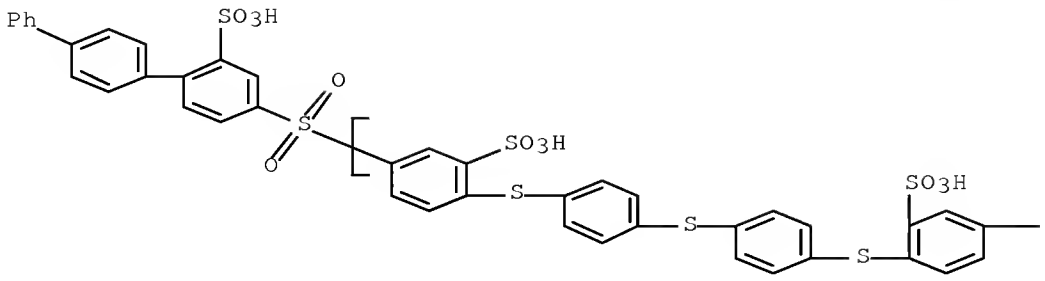


PAGE 1-B

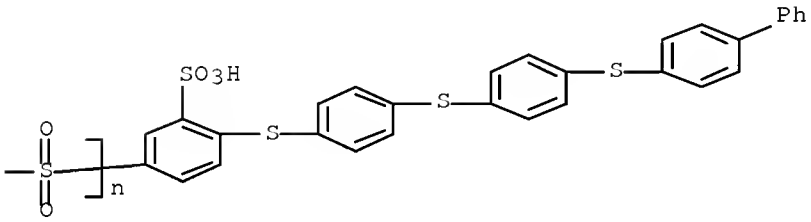


RN 686769-04-0 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene)], α-[4-[[4-[[4-([1,1'-biphenyl]-4-ylthio)phenyl]thio]phenyl]thio]-3-sulfophenyl]-ω-[(2-sulfo[1,1':4',1''-terphenyl]-4-yl)sulfonyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

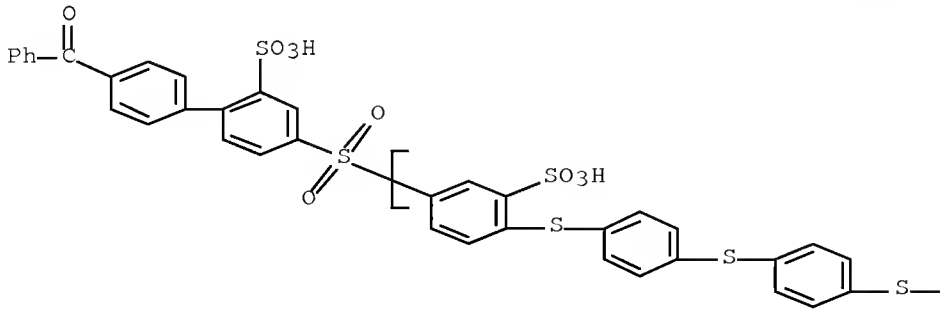


PAGE 1-B

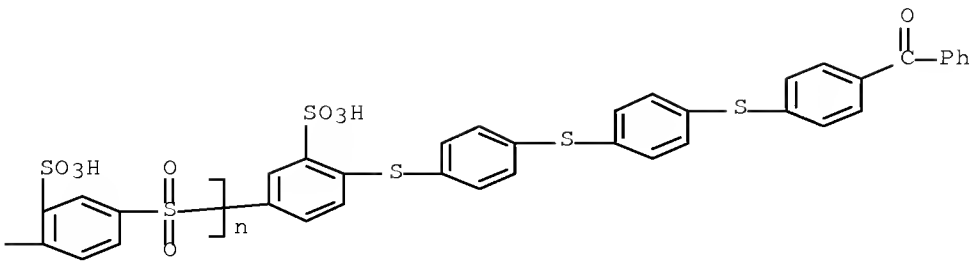


RN 686769-05-1 HCA
CN Poly[sulfonyl(3-sulfo-1,4-phenylene)thio-1,4-phenylenethio-1,4-phenylenethio(2-sulfo-1,4-phenylene)], α-[4-[[4-[[4-[(benzoylphenyl)thio]phenyl]thio]phenyl]thio]-3-sulfophenyl]-ω-[(4'-benzoyl-2-sulfo[1,1'-biphenyl]-4-yl)sulfonyl]- (9CI) (CA INDEX NAME)

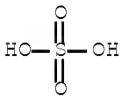
PAGE 1-A



PAGE 1-B



IT 7664-93-9, Sulfuric acid, reactions
(properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 36, 76
ST proton cond sulfonated polyarylenethioethersulfone fuel cell membrane separator endcapped
IT Polythioethers
(polysulfone-, aromatic, sulfonated; properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)
IT Polysulfones, preparation
(polythioether-, aromatic, sulfonated; properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)
IT 686768-99-0P, 3,3'-Disulfonated -4,4'-difluorodiphenyl sulfone-4,4'-thiobisbenzenthiol alternating copolymer 686769-00-6P 686769-01-7DP, end-capped with benzophenone 686769-02-8P 686769-03-9P 686769-04-0P 686769-05-1P
(properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)
IT 7664-93-9, Sulfuric acid, reactions 19362-77-7 57570-28-2 474242-18-7
(properties and proton conductivities of highly sulfonated polyarylenethioethersulfones for fuel cells)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|

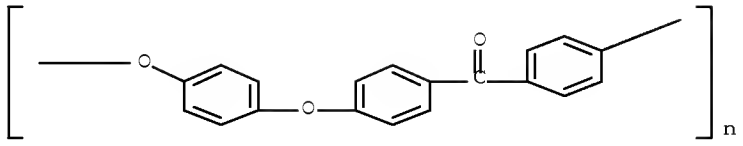
| | | | | | |
|---|---|---|---|---|---|
| Allam, C | 1999 | 200 | 1854 | Macromolecular Chemi | HCA |
| Dang, T | 2003 | 89 | 508 | Polymeric Materials: | HCA |
| Dimitrova, P | 2002 | 150 | 115 | Solid State Ionics | HCA |
| Kerres, J | 2001 | 185 | 3 | J Membrane Science | HCA |
| Schechter, A | 2002 | 147 | 1815 | Solid State Ionics | |
| Ueda, M | 1993 | 31 | 853 | Journal of Polymer S | HCA |
| Wainright, J | 1995 | 142 | L121 | J Electrochem Soc | HCA |
| Wang, J | 1996 | 41 | 193 | Electrochimica Acta | HCA |
| Wnag, F | 2001 | 175 | 387 | Macromolecules Sympo | |
| Zawodzinski, T | 1993 | 140 | 1041 | Journal of Electroch | HCA |

OS.CITING REF COUNT: 13 THERE ARE 13 CAPLUS RECORDS THAT CITE THIS RECORD (13 CITINGS)

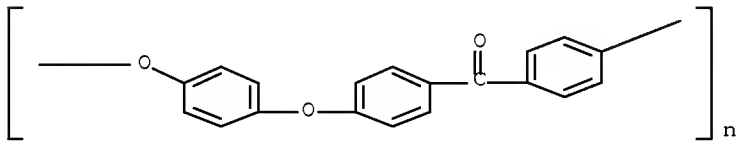
L98 ANSWER 13 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:256172 HCA Full-text
TITLE: Synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes
AUTHOR(S): Xing, Peixiang; Robertson, Gilles P.; Guiver, Michael D.; Mikhailenko, Serguei D.; Wang, Keping; Kaliaguine, Serge
CORPORATE SOURCE: Institute for Chemical Process and Environmental Technology, National Research Council, Ottawa, ON, K1A 0R6, Can.
SOURCE: Journal of Membrane Science (2004), 229(1-2), 95-106
CODEN: JMESDO; ISSN: 0376-7388
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Series of sulfonated poly(ether ether ketone)s (SPEEKs) were prepared by sulfonation of com. Victrex and Gatone PEEK for a comparative study of proton exchange membranes (PEM) intended for fuel cell applications. The degree of sulfonation (DS) of the sulfonated PEEK was determined from deuterated DMSO (DMSO-d6) solution of the purified polymers using 1H NMR methods. The 2nd method using a solvent suppression technique, in which DS results were obtained directly from 1H NMR spectra of SPEEK dissolved in sulfuric acid (nondeuterated) reaction medium was evaluated. The variation between the two methods was determined The room temperature sulfonation of PEEK, monitored directly by 2nd 1H NMR method, proceeded rapidly initially, reaching DS .apprx. 0.8 within 1 wk., but progressed slowly thereafter. A maximum DS of 1.0 was determined after 1 mo. at ambient temperature (.apprx. 22°). The thermal properties of SPEEK were characterized by DSC and TGA. The mass averaged mol. wts. Mw of both Victrex and Gatone PEEK were estimated from intrinsic viscosities measured in sulfuric acid solns. It was verified that higher temperature (55°) did not induce any apparent chain degradation of Victrex (or Gatone) PEEK by Mw tests. The water uptake and swelling properties of prepared films were studied and the proton conductivities at different temps. were measured. The conductivities of the SPEEKs increase with increasing DS and temps. The effect of film casting solvents on the conductivities is also discussed.

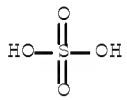
IT 31694-16-3DP, Victrex PEEK 450G, sulfonated (Gatone PEEK 5300P; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 31694-16-3, Gatone 5300P
(Victrex PEEK 450G; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, analysis
(synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST sulfonated poly ether ketone proton exchange membrane cond SPEEK
IT Polyketones
(polyether-, sulfonated; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Polyketones
(polyether-; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Polyethers, preparation
(polyketone-, sulfonated; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Polyethers, reactions
(polyketone-; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Ionic conductivity
(proton; synthesis and characterization of sulfonated poly(ether

ether ketone) for proton exchange membranes)
IT Fuel cell separators
Ion exchange membranes
Polyelectrolytes
Sulfonation
(synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Decomposition
(temperature of; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT Swelling, physical
(with water; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT 31694-16-3DP, Victrex PEEK 450G, sulfonated
(Gatone PEEK 5300P; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT 31694-16-3, Gatone 5300P
(Victrex PEEK 450G; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT 7732-18-5, Water, processes
(absorption; synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
IT 7664-93-9, Sulfuric acid, analysis
(synthesis and characterization of sulfonated poly(ether ether ketone) for proton exchange membranes)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Alberti, G | 2001 | 185 | 73 | J Membr Sci | HCA |
| Asensio, J | 2002 | 40 | 3703 | J Polym Sci A | HCA |
| Bailly, C | 1987 | 28 | 1009 | Polymer | HCA |
| Bauer, B | 2000 | 3 | 93 | J New Mater Electr S | HCA |
| Bishop, M | 1985 | 18 | 86 | Macromolecules | HCA |
| Daoust, D | 1992 | | | Advanced Thermoplast | |
| Daoust, D | 2001 | 50 | 917 | Polym Int | HCA |
| Daoust, D | 2001 | 50 | 925 | Polym Int | HCA |
| Devaux, J | 1985 | 26 | | Polymer | HCA |
| Genies, C | 2001 | 42 | 359 | Polymer | HCA |
| Guo, X | 2002 | 35 | 6707 | Macromolecules | HCA |
| Helmer-Metamann, F | 1995 | | | US 5438082 | HCA |
| Huang, R | 2001 | 82 | 2651 | J Appl Polym Sci | HCA |
| Inzelt, G | 2000 | 45 | 2403 | Electrochim Acta | HCA |
| Jin, X | 1985 | 17 | 4 | Br Polym J | HCA |
| Jones, D | 2001 | 185 | 41 | J Membr Sci | HCA |
| Kaliaguine, S | 2003 | 82 | 213 | Catal Today | HCA |
| Kerres, J | 2001 | 185 | 3 | J Membr Sci | HCA |
| Kerres, J | 1999 | 125 | 243 | Solid State Ionics | HCA |
| Kobayashi, T | 1998 | 106 | 219 | Solid State Ionics | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci | HCA |
| Kreuer, K | 1995 | 95 | 241 | Proc Electrochem Soc | |
| Luo, Y | 1995 | 34 | 229 | J Anal Appl Pyrol | HCA |
| Manea, C | 2002 | 206 | 443 | J Membr Sci | HCA |
| Mikhailenko, S | 2000 | 38 | 1386 | J Polym Sci B | HCA |
| Ogawa, T | 1985 | 23 | 1231 | J Polym Sci A | HCA |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |

| | | | | | |
|---|---|---|---|---|---|
| Robertson, G | 2003 | 219 | 113 | J Membr Sci | HCA |
| Savadogo, O | 1998 | 1 | 47 | J New Mater Electr S | HCA |
| Shibuya, N | 1994 | 35 | 3237 | Polymer | HCA |
| Soczka-Guth, T | 1999 | | | WO 9929763 | HCA |
| Ulrich, H | 1998 | 263 | 71 | Die Angew Makromol C | HCA |
| Wang, F | 2002 | 197 | 231 | J Membr Sci | HCA |
| Wang, F | 1999 | 40 | 795 | Polymer | HCA |
| Wijers, M | 1998 | 147 | 117 | J Membr Sci | HCA |
| Wilhelm, F | 2002 | 199 | 167 | J Membr Sci | HCA |
| Yen, S | 1998 | | | US 5795496 | HCA |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |

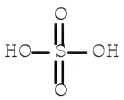
OS.CITING REF COUNT: 257 THERE ARE 257 CAPLUS RECORDS THAT CITE THIS RECORD (258 CITINGS)

L98 ANSWER 14 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:114078 HCA Full-text
TITLE: Proton-conducting composite membranes derived from sulfonated hydrocarbon and inorganic materials
AUTHOR(S): Chang, Jae-Hyuk; Park, Jong Hyeok; Park, Gu-Gon; Kim, Chang-Soo; Park, O. Ok
CORPORATE SOURCE: Department of Chemical & Biomolecular Engineering, Korea Advanced Institute of Science and Technology, Daejeon, 305-701, S. Korea
SOURCE: Journal of Power Sources (2003), 124(1), 18-25
CODEN: JPSODZ; ISSN: 0378-7753
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

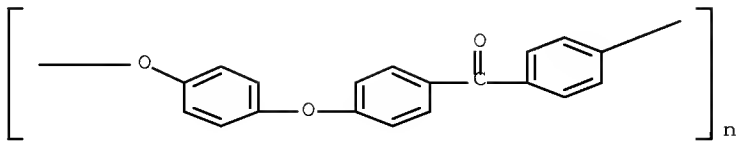
AB Composite polymer membranes are prepared by embedding layered silicates such as Laponite and Montmorillonite (MMT) into sulfonated poly(ether ether ketone) (sPEEK) membranes for fuel-cell applications. Sulfonation of the polymer increased membrane hydrophilicity to give good proton conductivity Layered silicates incorporated into polymer membranes help to reduce swelling significantly in hot water; they also help to decrease methanol permeability. These polymer/clay composite membranes show thermal stability to 240° and (3-3.5)+10-3 S cm-1 proton conductivity at room temperature Methanol cross-over is reduced without a serious reduction in the proton conductivity In a single-cell test using hydrogen and oxygen, the prepared membranes give current densities that are 70-80% of those with Nafion 115 membranes. As a result, for polymer electrolytes, sPEEK/clay composite membranes offer a low-cost alternative to perfluorinated membranes.

IT 7664-93-9, Sulfuric acid, reactions 31694-16-3
(proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)

RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 49, 76
ST proton conducting composite clay membrane sulfonated polymer fuel cell
IT Membranes, nonbiological
(composite; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Humidity
(effect on electrochem. performance of fuel cell; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Membranes, nonbiological
(elec. conductive; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Ion exchange
(hydrogen for sodium in silicate structure; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Silicates, uses
(layered, embedded into SPEEK; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Carbon fibers, uses
(membrane electrode support; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Electric current-potential relationship
(of fuel cells with the membranes; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Electric resistance
(of membranes; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Polyketones
(polyether-, sulfonated, composite membranes with clays; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Polyethers, uses
(polyketone-, sulfonated, composite membranes with clays; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT Current density
Fuel cell separators
Fuel cells
Permeability
Polymer electrolytes
Sulfonation
Thermal stability
(proton-conducting composite membranes derived from

sulfonated hydrocarbon and layered silicates)
IT Ionic conductivity
(proton; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 7732-18-5, Water, processes
(absorption of; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 647827-07-4
(embedded into SPEEK; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 1333-74-0, Hydrogen, uses 7782-44-7, Oxygen, uses
(fuel cell fuel; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 7440-06-4, Platinum, uses
(membrane electrode with Nafion/carbon; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 7440-44-0, Carbon, uses
(membrane electrode with Nafion/platinum; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 77950-55-1, Nafion 115
(membranes and membrane electrode with Pt/carbon; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 67-56-1, Methanol, processes
(proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 7664-93-9, Sulfuric acid, reactions 31694-16-3
(proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
IT 1318-93-0, Montmorillonite ((Al1.33-1.67Mg0.33-0.67)(Ca0-1Na0-1)0.33Si4(OH)2O10.xH2O), uses
(sodium-rich, embedded into SPEEK; proton-conducting composite membranes derived from sulfonated hydrocarbon and layered silicates)
RETABLE

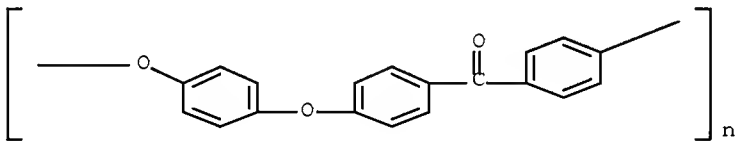
| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Bailly, C | 1987 | 28 | 1009 | Polymer | HCA |
| Bishop, M | 1985 | 18 | 86 | Macromolecules | HCA |
| Colquhoun, H | 1997 | 38 | 4539 | Polymer | HCA |
| Jin, X | 1985 | 17 | 4 | Br Polym J | HCA |
| Jochen, A | 2001 | 185 | 3 | J Membr Sci | |
| Kawahara, M | 2000 | 136 | 1193 | Solid State Ionics | |
| Kopitzke, R | 2000 | 147 | 1677 | J Electrochem Soc | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci | HCA |
| Pu, C | 1995 | 142 | 119 | J Electrochem Soc | |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Wainright, J | 1995 | 142 | L121 | J Electrochem Soc | HCA |
| Walker, M | 1999 | 116 | 996 | Surf Coat Technol | |
| Wilhelm, F | 2002 | 199 | 167 | J Membr Sci | HCA |
| Zanetti, M | 2000 | 279 | 1 | Macromol Mater Eng | HCA |

OS.CITING REF COUNT: 53 THERE ARE 53 CAPLUS RECORDS THAT CITE THIS RECORD (55 CITINGS)

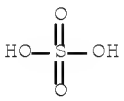
L98 ANSWER 15 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:96801 HCA Full-text
TITLE: Sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell
AUTHOR(S): Li, Lei; Zhang, Jun; Wang, Yuxin
CORPORATE SOURCE: Membrane Technology Center, Chinese Academy of Sciences, Shanghai Institute of Nuclear Research, Shanghai, 201800, Peop. Rep. China
SOURCE: Journal of Membrane Science (2003), 226(1-2), 159-167
CODEN: JMESDO; ISSN: 0376-7388
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Sulfonated poly(ether ether ketone) (SPEEK) membranes with various degrees of sulfonation (DS) were prepared Their proton conductivity and methanol permeability as a function of temperature were studied. The proton conductivity of SPEEK membranes exceeded 10-2 S/cm >80°, which is close to that of Nafion 115 membrane under the same condition. The methanol permeability of SPEEK membranes was about an order of magnitude lower than that of Nafion 115 membrane. The direct methanol fuel cell (DMFC) performance of the SPEEK membranes was better than that of Nafion 115 membrane at 80°.

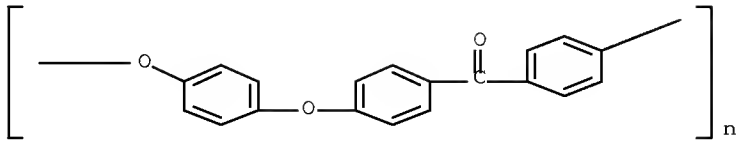
IT 31694-16-3DP, PEEK, sulfonated
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions 31694-16-3, PEEK
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 36, 38, 76
ST sulfonated poly ether ketone membrane methanol fuel cell permeability; PEEK sulfonated proton cond membrane
IT Membrane electrodes
(containing carbon, Nafion, carbon cloth, and Pt or Pt/Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Membranes, nonbiological
(elec. conductive; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Permeability
(of methanol through membranes; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Polyketones
(polyether-, sulfonated; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Polyethers, uses
(polyketone-, sulfonated; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Ionic conductivity
(proton; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT Fuel cell separators
Fuel cells
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 7732-18-5, Water, processes
(absorption; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 31694-16-3DP, PEEK, sulfonated
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 77950-55-1, Nafion 115
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 7782-42-5, Graphite, uses
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 67-56-1, Methanol, uses
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell)
IT 7664-93-9, Sulfuric acid, reactions 31694-16-3, PEEK
(sulfonated poly(ether ether ketone) membranes

for direct methanol fuel cell)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Bauer, B | 2000 | 3 | 93 | J New Mater Electroc | HCA |
| Bishop, M | 1985 | 18 | 86 | Macromolecules | HCA |
| Bouchet, R | 1997 | 144 | L95 | J Electrochem Soc | HCA |
| Choi, W | 2001 | 96 | 411 | J Power Sources | HCA |
| Hogarth, M | 1996 | 40 | 150 | Platinum Met Rev | HCA |
| Huang, R | 2001 | 82 | 2651 | J Appl Polym Sci | HCA |
| Jin, X | 1985 | 17 | 4 | Br Polym J | HCA |
| Kerres, J | 2001 | 185 | 3 | J Membr Sci | HCA |
| Kopitzke, R | 2000 | 147 | 1677 | J Electrochem Soc | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci | HCA |
| Li, L | 2003 | 3 | 452 | Acta Polym Sin | |
| Li, L | 2002 | 10 | 614 | Chin J Chem Eng | HCA |
| Li, L | 2003 | 57 | 1406 | Mater Lett | HCA |
| Pivovar, B | 1999 | 154 | 155 | J Membr Sci | HCA |
| Pu, C | 1995 | 142 | L119 | J Electrochem Soc | HCA |
| Ren, X | 1995 | 95 | 284 | Electrochem Soc Proc | |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Surampudi, S | 1994 | 47 | 377 | J Power Sources | HCA |
| Tricoli, V | 1998 | 145 | 3798 | J Electrochem Soc | HCA |
| Tricoli, V | 2000 | 147 | 1286 | J Electrochem Soc | HCA |
| Wang, J | 1995 | 142 | 4218 | J Electrochem Soc | HCA |
| Yeo, R | 1983 | 130 | 533 | J Electrochem Soc | HCA |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |
| Zhang, J | 2002 | 8 | 315 | Electrochemistry | HCA |

OS.CITING REF COUNT: 134 THERE ARE 134 CAPLUS RECORDS THAT CITE THIS RECORD (136 CITINGS)

L98 ANSWER 16 OF 21 HCA COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 140:96780 HCA Full-text

TITLE: Organic/inorganic composite membranes for application in DMFC

AUTHOR(S): Ruffmann, B.; Silva, H.; Schulte, B.; Nunes, S. P.

CORPORATE SOURCE: Institute of Chemistry, GKSS Research Centre, Geesthacht, D-21502, Germany

SOURCE: Solid State Ionics (2003), 162-163, 269-275
CODEN: SSIOD3; ISSN: 0167-2738

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

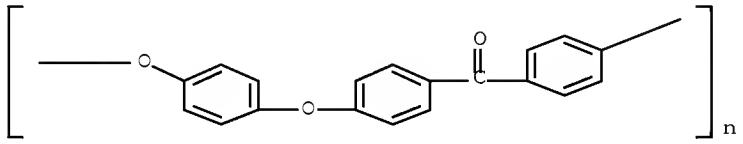
AB Zirconium phosphate as inorg. compound was chosen for studies concerning mainly the swelling behavior of composite membranes for the direct methanol fuel cell (DMFC). Swelling in liquid systems and in vapor systems at 100% relative humidity conditions was studied. The fluxes of water and methanol through the membranes were obtained from pervaporation expts. The conductivity of the developed membranes was determined by impedance spectroscopy. Two different cells for impedance measurements were used. In one cell, the membrane sample is in contact with an electrolyte solution during the measurement. In the 2nd cell, swelling of the membrane sample can be varied by controlling temperature and relative humidity (RH). The in situ generation of inorg. oxides like zirconia by hydrolysis of the alkoxides in the polymer solution decreases water and methanol flux through the membranes.

The addition of well-dispersed zirconium phosphate to the polymer solution increases the membranes' conductivity Both effects can be explained by the swelling behavior of the composites. The performance of some membranes in a methanol fuel cell test system is discussed with regard to the swelling behavior and the methanol permeability.

IT 31694-16-3D, PEEK, sulfonated
(organic/inorg. composite membranes for application in DMFC)

RN 31694-16-3 HCA

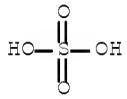
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions
(organic/inorg. composite membranes for application in DMFC)

RN 7664-93-9 HCA

CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 36, 38, 76

ST sulfonated polyetherketone composite membrane DMFC cond permeability water sorption

IT Membrane electrodes
(carbon/PT or Pt-Ru/PTFE or Nafion; organic/inorg. composite membranes for application in DMFC)

IT Membranes, nonbiological
(composite; organic/inorg. composite membranes for application in DMFC)

IT Electric current-potential relationship
(of composite membranes assembled fuel cell; organic/inorg. composite membranes for application in DMFC)

IT Exfoliation
Fuel cell separators
Permeability
Pervaporation
Swelling, physical
(organic/inorg. composite membranes for application in DMFC)

IT Polybenzimidazoles
(organic/inorg. composite membranes for application in DMFC)

IT Polyketones
(polyether-, sulfonated, composites membranes with zirconia and/or zirconium phosphate; organic/inorg. composite membranes for application in DMFC)
IT Polyethers, uses
(polyketone-, sulfonated, composites membranes with zirconia and/or zirconium phosphate; organic/inorg. composite membranes for application in DMFC)
IT Composites
(polymer/inorg.; organic/inorg. composite membranes for application in DMFC)
IT Ionic conductivity
(proton; organic/inorg. composite membranes for application in DMFC)
IT Humidity
(relative; organic/inorg. composite membranes for application in DMFC)
IT 13765-95-2P, Zirconium phosphate
(composite membranes impregnated with; organic/inorg. composite membranes for application in DMFC)
IT 1314-23-4P, Zirconium dioxide, preparation
(composite membranes impregnated with; organic/inorg. composite membranes for application in DMFC)
IT 124-38-9, Carbon dioxide, analysis
(organic/inorg. composite membranes for application in DMFC)
IT 31694-16-3D, PEEK, sulfonated
(organic/inorg. composite membranes for application in DMFC)
IT 67-56-1, Methanol, uses
(organic/inorg. composite membranes for application in DMFC)
IT 163294-14-2, Nafion 112
(organic/inorg. composite membranes for application in DMFC)
IT 107-10-8, n-Propylamine, reactions 7664-93-9, Sulfuric acid, reactions
(organic/inorg. composite membranes for application in DMFC)
IT 7732-18-5, Water, processes
(permeability of; organic/inorg. composite membranes for application in DMFC)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Alberti, G | 2001 | 185 | 73 | J Membr Sci | HCA |
| Alberti, G | 1998 | 470 | 81 | J Mol Struct | HCA |
| Alberti, G | 2000 | 16 | 7663 | Langmuir | HCA |
| Alberti, G | 1996 | 84 | 97 | Solid State Ionics | HCA |
| Belyakov, V | 1999 | | | US 5932361 | HCA |
| Benavente, J | 2000 | 175 | 43 | J Membr Sci | HCA |
| Bonnet, B | 2000 | 3 | 87 | J New Mater Electroc | HCA |
| Casciola, M | 1989 | 35 | 67 | Solid State Ionics | |
| Choi, K | 2000 | 86 | 197 | J Power Sources | HCA |
| Choi, W | 2001 | 96 | 411 | J Power Sources | HCA |
| Costantino, U | 1997 | 97 | 261 | Solid State Ionics | HCA |
| Dammak, L | 2001 | 47 | 451 | Electrochim Acta | HCA |

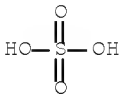
| | | | | | |
|---|---|---|---|---|---|
| Dreisbach, F | 2000 | 62 | 515 | J Therm Anal Calorim | HCA |
| Freire, T | 2001 | 503 | 57 | J Electroanal Chem | HCA |
| Glipa, X | 1997 | 97 | 227 | Solid State Ionics | HCA |
| Gmehling, J | 1977 | | | Vapour-Liquid Equili | |
| Gornet, N | 1998 | 8 | Pr5 | J Phys, IV (France) | |
| Gulzow, E | 2002 | 105 | 261 | J Power Sources | HCA |
| Jones, D | 2001 | 185 | 41 | J Membr Sci | HCA |
| Jung, D | 2001 | 26 | 1263 | Int J Hydrogen Energ | HCA |
| Kim, J | 2001 | 201 | 129 | J Membr Sci | |
| Kjaer, J | 1991 | 46 | 169 | Solid State Ionics | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci | HCA |
| Manea, C | 2002 | 206 | 443 | J Membr Sci | HCA |
| Nunes, S | 2002 | 203 | 215 | J Membr Sci | HCA |
| Park, Y | 2000 | 19 | 1735 | J Mater Sci Lett | HCA |

OS.CITING REF COUNT: 51 THERE ARE 51 CAPLUS RECORDS THAT CITE THIS RECORD (51 CITINGS)

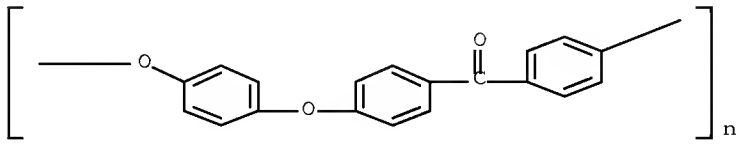
L98 ANSWER 17 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:79707 HCA Full-text
TITLE: Polyetheretherketone Membranes for Elevated Temperature PEMFCs
AUTHOR(S): Lakshmanan, Balasubramanian; Huang, Wayne; Olmeijer, David; Weidner, John W.
CORPORATE SOURCE: Department of Chemical Engineering, Center for Electrochemical Engineering, University of South Carolina, Columbia, SC, 29208, USA
SOURCE: Electrochemical and Solid-State Letters ( 2003), 6(12), A282-A285
CODEN: ESLEF6; ISSN: 1099-0062
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Membrane electrode assemblies (MEAs) made from polyetheretherketone (PEEK) showed excellent fuel cell performance and thermal stability in the presence of substantial CO at elevated temps. (i.e., 120°C) in proton exchange membrane fuel cells (PEMFCs). For example, the current from a MEA made from PEEK membrane at 0.6 V and 120°C was 0.50 A/cm2 when run on pure hydrogen and 0.45 A/cm2 when run on reformate (50% H2, 1300 ppm CO, and balance N2). The c.d. from a MEA made from Nafion at 0.6 V and 120°C was 0.61 A/cm2 when run on pure hydrogen. The main difference between these two MEAs is that the ionic conductivity of the PEEK membrane at 120°C was 3.38+10-2 S/cm, which is approx. three times lower than Nafion. Although it is not surprising that CO tolerance increases with increasing temperature, we are the first to show less than 10% drop in performance with 1300 ppm CO at 120°C. Even though Nafion membranes have higher conductivity, PEEK membranes lasted for 350 h thereby outlasting Nafion membranes by seven to eight times.

IT 7664-93-9, Sulfuric acid, processes
(polyetheretherketone membranes for elevated temperature PEMFCs)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3D, PEEK, sulfonated
(polyetheretherketone membranes for elevated temperature PEMFCs)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38, 72, 76
ST polyetheretherketone membrane elevated temp PEM fuel cell
IT Fuel cells
(PEM; polyetheretherketone membranes for elevated temperature PEMFCs)
IT Polyketones
(polyether-, sulfonated; polyetheretherketone membranes for elevated temperature PEMFCs)
IT Current density
Electric current-potential relationship
Fuel cell separators
Ionic conductivity
Sulfonation
Thermal stability
(polyetheretherketone membranes for elevated temperature PEMFCs)
IT Polybenzimidazoles
(polyetheretherketone membranes for elevated temperature PEMFCs)
IT Polyethers, uses
(polyketone-, sulfonated; polyetheretherketone membranes for elevated temperature PEMFCs)
IT Casting of polymeric materials
(solution; polyetheretherketone membranes for elevated temperature PEMFCs)
IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses 7440-44-0, Carbon, uses
(polyetheretherketone membranes for elevated temperature PEMFCs)
IT 630-08-0, Carbon monoxide, processes 1333-74-0, Hydrogen, processes 7664-93-9, Sulfuric acid, processes 7727-37-9, Nitrogen, processes
(polyetheretherketone membranes for elevated temperature PEMFCs)
IT 25014-41-9, Polyacrylonitrile 31694-16-3D, PEEK, sulfonated
(polyetheretherketone membranes for elevated temperature PEMFCs)
IT 127-19-5, Dimethylacetamide
(polyetheretherketone membranes for elevated temperature PEMFCs)
RETABLE

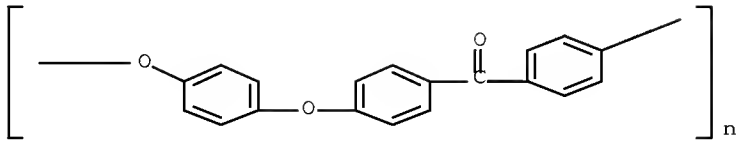
| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Adjemian, K | 2002 | 149 | A256 | J Electrochem Soc | HCA |
| Bonnet, B | 2000 | 3 | 87 | J New Mater Electroc | HCA |
| Bristow, J | 1997 | 38 | 287 | Polymer | HCA |
| Dimitrova, P | 2001 | 185 | 59 | J Membr Sci | |
| Hirchenhofer, J | 1998 | | 7 | Fuel Cells, A Handbo | |
| Kobayashi, T | 1998 | 106 | 219 | Solid State Ionics | HCA |
| Lee, S | 1999 | 44 | 3283 | Electrochim Acta | HCA |
| Mikhailenko, S | 2001 | 67 | 225 | Catal Today | HCA |
| Miyake, N | 2001 | 148 | A898 | J Electrochem Soc | HCA |
| Narang, S | 2002 | | | US 127454 | |
| Savinell, R | 1998 | PV 98 | 81 | The Electrochemical | |
| Staiti, P | 2001 | 145 | 101 | Solid State Ionics | HCA |
| Tazi, B | 2000 | 45 | 4329 | Electrochim Acta | HCA |
| Yang, C | 2001 | 103 | 1 | J Power Sources | HCA |
| Yea, S | 1977 | 21 | 875 | J Appl Polym Sci | |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |

OS.CITING REF COUNT: 21 THERE ARE 21 CAPLUS RECORDS THAT CITE THIS RECORD (21 CITINGS)

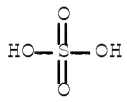
L98 ANSWER 18 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:44633 HCA Full-text
TITLE: Sulfonated Poly(ether ether ketone) Membranes for Direct Methanol Fuel Cells
AUTHOR(S): Yang, B.; Manthiram, A.
CORPORATE SOURCE: Materials Science and Engineering Program, The University of Texas at Austin, Austin, TX, 78712, USA
SOURCE: Electrochemical and Solid-State Letters (2003), 6(11), A229-A231
CODEN: ESLEF6; ISSN: 1099-0062
PUBLISHER: Electrochemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Sulfonated poly(ether ether ketone) (SPEEK) with different degrees of sulfonation was prepared and evaluated as proton exchange membrane electrolytes in direct methanol fuel cells (DMFCs). The membranes were characterized by ion-exchange capacity, proton conductivity, and liquid uptake measurements. The proton conductivity of the SPEEK membranes increases with increasing sulfonation level, and are lower than that of Nafion. The percent liquid uptake increases with increasing temperature, methanol concentration, and degree of sulfonation. Within a narrow range of sulfonation of .apprx.50%, the SPEEK membranes exhibit electrochem. performances comparable to or exceeding that of Nafion at 65°, making it an attractive low-cost alternative to Nafion. The better performance of the SPEEK membranes is due to the suppression of methanol permeability as indicated by a lower methanol crossover c.d. at the cathode.

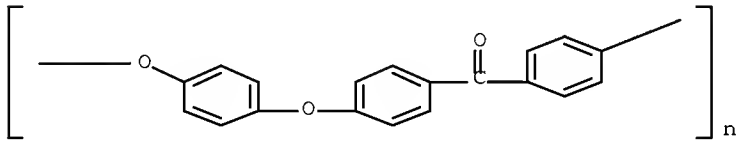
IT 31694-16-3DP, sulfonated
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes
)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IT 31694-16-3
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38, 72, 76
ST sulfonated poly ether ketone membrane electrode methanol fuel cell
IT Polyelectrolytes
(anionic; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)
IT Carbon black, uses
(composite electrodes with Nafion, and Pt and anodes also with Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)
IT Membranes, nonbiological
(elec. conductive; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)
IT Polyoxyalkylenes, uses

(fluorine- and sulfo-containing, ionomers, composite electrodes with Vulcan XC-72R, and Pt and anodes also with Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Current density
(loss due to methanol crossover; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Absorption
(of water and methanol by polyelectrolyte membranes SPEEK and Nafion 115; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Polyketones
(polyether-; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Polyethers, uses
(polyketone-; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Fluoropolymers, uses
(polyoxyalkylene-, sulfo-containing, ionomers, composite electrodes with Vulcan XC-72R, and Pt and anodes also with Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Ionomers
(polyoxyalkylenes, fluorine- and sulfo-containing, composite electrodes with Vulcan XC-72R, and Pt and anodes also with Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Ionic conductivity
(proton; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT Electric current-potential relationship
Electric impedance
Fuel cells
Membrane electrodes
Sulfonation
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes
)

IT Ion exchange
(to characterize degree of sulfonation; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 7732-18-5, Water, processes
(absorption of; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 7440-18-8, Ruthenium, uses
(composite electrodes with Vulcan XC-72R, Nafion, and Pt; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes
)

IT 7440-06-4, Platinum, uses

(composite electrodes with Vulcan XC-72R, Nafion, and anodes also with Ru; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 77950-55-1, Nafion 115
(for comparison membrane electrode assembly; sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 31694-16-3DP, sulfonated
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 67-56-1, Methanol, uses
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 7664-93-9, Sulfuric acid, reactions
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

IT 31694-16-3
(sulfonated poly(ether ether ketone) membranes for direct methanol fuel cell electrodes)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|
| Bauer, B | 2000 | 3 | 93 | J New Mater Electroc | HCA |
| Bishop, M | 1985 | 18 | 86 | Macromolecules | HCA |
| Bonnet, B | 2000 | 3 | 87 | J New Mater Electroc | HCA |
| Eisenberg, A | 1982 | | | Perfluorinated Ionom | |
| Fang, J | 2002 | 35 | 9022 | Macromolecules | HCA |
| Genies, C | 2001 | 42 | 359 | Polymer | HCA |
| Kerres, J | 1999 | 125 | 243 | Solid State Ionics | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci, Sp Iss | HCA |
| Kreuer, K | 2000 | 10 | 279 | J Phys IV | |
| Kreuer, K | 1997 | 97 | 1 | Solid State Ionics | HCA |
| Lufrano, F | 2001 | 145 | 47 | Solid State Ionics | HCA |
| Manea, C | 2002 | 206 | 443 | J Membr Sci, Sp Iss | HCA |
| Nunes, S | 2002 | 203 | 215 | J Membr Sci | HCA |
| Ren, X | 2000 | 147 | 466 | J Electrochem Soc | HCA |
| Ren, X | 2000 | 147 | 92 | J Electrochem Soc | HCA |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Samms, S | 1996 | 143 | 1498 | J Electrochem Soc | HCA |
| Schechter, A | 2002 | 147 | 181 | Solid State Ionics | HCA |
| Sone, Y | 1996 | 143 | 1254 | J Electrochem Soc | HCA |
| Wang, J | 1996 | 26 | 751 | J Appl Electrochem | HCA |
| Xiong, L | 2002 | 4 | 898 | Electrochem Commun | HCA |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |
| Zawodzinski, T | 1993 | 140 | 1041 | J Electrochem Soc | HCA |
| Zawodzinski, T | 1993 | 140 | 1981 | J Electrochem Soc | HCA |

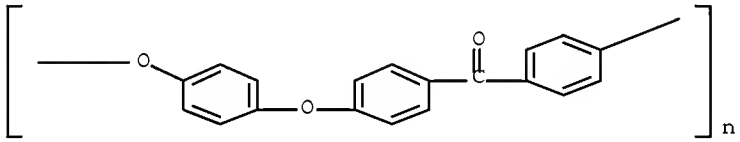
OS.CITING REF COUNT: 78 THERE ARE 78 CAPLUS RECORDS THAT CITE THIS RECORD (79 CITINGS)

L98 ANSWER 19 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 139:367379 HCA Full-text

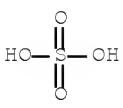
TITLE: Properties of SPEEK based PEMs for fuel cell application
AUTHOR(S): Kaliaguine, S.; Mikhailenko, S. D.; Wang, K. P.; Xing, P.; Robertson, G.; Guiver, M.
CORPORATE SOURCE: Chemical Engineering Department, Laval University, QC, Can.
SOURCE: Catalysis Today (2003), 82(1-4), 213-222
CODEN: CATTEA; ISSN: 0920-5861
PUBLISHER: Elsevier Science B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Comparative studies of membranes prepared using different solvents, showed that the casting solvent plays a significant role, affecting their proton conductivity and mech. strength. Using DMF strongly decreases the membrane conductivity in comparison with other solvents studied. The 1H NMR results yield an insight into the mechanism of this effect, evidencing the formation of the strong hydrogen bonding of sulfonic acid groups with DMF. This can explain the large discordances of more than an order of magnitude existing between the conductivity results for sulfonated polyetheretherketone (PEEK) in some previous studies and. Also residual sulfuric acid, which is very difficult to eliminate from highly sulfonated polyetheretherketone (SPEEK), also affects its conductivity and under high temperature treatment, enters into reaction with both DMF and N,N-dimethylacetamide (DMAc), causing their degradation As discussed in the present contribution, the conductivity measurement technique may also be a reason for discrepancy in the reported conductivity characteristics of SPEEK.

IT 31694-16-3DP, sulfonated
(properties of SPEEK based PEMs for fuel cell application)
RN 31694-16-3 HCA
CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, reactions
(properties of SPEEK based PEMs for fuel cell application)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 36, 38, 76

ST SPEEK fuel cell separator proton cond membrane sulfonated PEEK; polyetheretherketone sulfonated hydrogen bonding Tg water sorption solvent effect

IT Solvents
(effect on membrane properties; properties of SPEEK based PEMs for fuel cell application)

IT Membranes, nonbiological
(elec. conductive; properties of SPEEK based PEMs for fuel cell application)

IT Glass transition temperature
(of sulfonated PEEK polymers, influence of casting solvent on; properties of SPEEK based PEMs for fuel cell application)

IT Polyketones
(polyether-, Gatone PEEK and Victrex PEEK; properties of SPEEK based PEMs for fuel cell application)

IT Polyketones
(polyether-, sulfonated, Victrex PEEK and Gatone PEEK; properties of SPEEK based PEMs for fuel cell application)

IT Polyethers, reactions
(polyketone-, Gatone PEEK and Victrex PEEK; properties of SPEEK based PEMs for fuel cell application)

IT Polyethers, uses
(polyketone-, sulfonated, Victrex PEEK and Gatone PEEK; properties of SPEEK based PEMs for fuel cell application)

IT Fuel cell electrolytes
Fuel cell separators
Hydrogen bond
Thermal stability
(properties of SPEEK based PEMs for fuel cell application)

IT Ionic conductivity
(proton; properties of SPEEK based PEMs for fuel cell application)

IT 31694-16-3, PEEK
(Victrex PEEK and Gatone PEEK; properties of SPEEK based PEMs for fuel cell application)

IT 7732-18-5, Water, uses
(blend with acetone, and absorption; properties of SPEEK based PEMs for fuel cell application)

IT 67-64-1, Acetone, uses
(blend with water; properties of SPEEK based PEMs for fuel cell application)

IT 144-55-8, Sodium bicarbonate, uses
(effect on hydrogen bonding in cast films; properties of SPEEK based PEMs for fuel cell application)

IT 31694-16-3DP, sulfonated
(properties of SPEEK based PEMs for fuel cell application)

IT 68-12-2, DMF, uses 127-19-5, N,N-Dimethylacetamide
(properties of SPEEK based PEMs for fuel cell application)

IT 7664-93-9, Sulfuric acid, reactions
(properties of SPEEK based PEMs for fuel cell application)

RETABLE

| Referenced Author | Year | VOL | PG | Referenced Work | Referenced |
|---|---|---|---|---|---|

| (RAU) | (RPY) | (RVL) | (RPG) | (RWK) | File |
|---|---|---|---|---|---|
| Bishop, M | 1985 | 18 | 86 | Macromolecules | HCA |
| Bonnet, B | 2000 | 3 | 87 | J New Mater Electroc | HCA |
| Cui, W | 1998 | 14 | 145 | Separ Purif Technol | HCA |
| Genies, R | 2001 | 42 | 359 | Polymer | |
| Ise, M | 1999 | 125 | 213 | Solid State Ionics | HCA |
| Kim, Y | 2001 | 85 | 521 | Polym Mater Sci Eng | |
| Kobayashi, T | 1998 | 106 | 219 | Solid State Ionics | HCA |
| Kreuer, K | 2001 | 185 | 185 | J Membr Sci | |
| Lufrano, F | 2000 | 77 | 250 | J Appl Polym Sci | |
| Mikhailenko, S | 2001 | 67 | 225 | Catal Today | HCA |
| Mikhailenko, S | 2000 | 38 | 1386 | J Polym Sci B (Physi | HCA |
| Park, M | 1996 | 64 | 743 | Denki Kagaku | HCA |
| Rikukawa, M | 2000 | 25 | 1463 | Prog Polym Sci | HCA |
| Samms, S | 1996 | 143 | 1225 | J Electrochem Soc | HCA |
| Savadogo, O | 1998 | 1 | 47 | J New Mater Electroc | HCA |
| Wang, F | 2002 | 197 | 231 | J Membr Sci | HCA |
| Zaidi, J | 2000 | 3 | 27 | J New Mater Electroc | |
| Zaidi, S | 2000 | 173 | 17 | J Membr Sci | HCA |
| Zawodzinki, T | 1991 | 95 | 6040 | J Phys Chem | |

OS.CITING REF COUNT: 100 THERE ARE 100 CAPLUS RECORDS THAT CITE THIS RECORD (100 CITINGS)

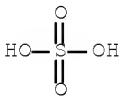
L98 ANSWER 20 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 139:77168 HCA Full-text
TITLE: Sulfonated polyarylene composition and proton-conductive membrane
INVENTOR(S): Okaniwa, Motoki; Goto, Kohei
PATENT ASSIGNEE(S): JSR Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2003183526 | A | 20030703 | JP 2001-391748 | 200112 25 <-- |
| PRIORITY APPLN. INFO.: | | | JP 2001-391748 | 200112 25 <-- |

AB The composition contains a sulfonated polyarylene, a hindered phenol with mol. weight ≥500, and a hindered amine with mol. weight ≥500. The proton-conductive membrane, useful as a solid electrolyte in a fuel cell, etc., is made of the composition showing resistance to oxidation and mech. strength.

IT 7664-93-9DP, Sulfuric acid, polyarylene sulfonate with 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated
(sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)

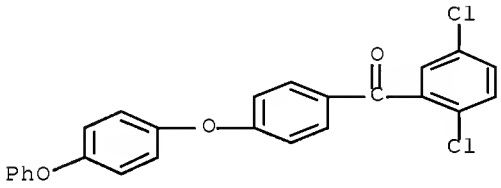
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



RN 463963-71-5 HCA
CN Methanone, bis(4-chlorophenyl)-, polymer with (2,5-dichlorophenyl)[4-(4-phenoxyphenoxy)phenyl]methanone and 4,4'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[phenol] (9CI) (CA INDEX NAME)

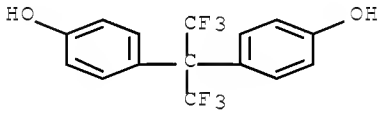
CM 1

CRN 463954-50-9
CMF C25 H16 Cl2 O3



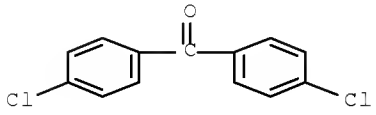
CM 2

CRN 1478-61-1
CMF C15 H10 F6 O2



CM 3

CRN 90-98-2
CMF C13 H8 Cl2 O



IPCI C08L0101-06 [ICM,7]; C08L0101-00 [ICM,7,C*]; C08K0005-13 [ICS,7]; C08K0005-3435 [ICS,7]; C08K0005-00 [ICS,7,C*]; H01B0001-06 [ICS,7]; H01M0008-02 [ICS,7]
IPCR C08L0101-00 [I,C*]; C08L0101-06 [I,A]; C08K0005-00 [I,C*]; C08K0005-13 [I,A]; C08K0005-3435 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]
CC 76-2 (Electric Phenomena)
Section cross-reference(s): 38
ST sulfonated polyarylene compn proton conductive membrane; hindered phenol antioxidant sulfonated polyarylene; amine hindered antioxidant sulfonated polyarylene
IT Amines, uses
Phenols, uses
(hindered; sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT Polyoxyarylenes
(polyketone-; sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT Ionic conductors
(polymeric, protonic; sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT Polyketones
(polyoxyarylene-; sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT Antioxidants
(sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT 7664-93-9DP, Sulfuric acid, polyarylene sulfonate with 364062-39-5DP, 4,4'-Dichlorobenzophenone-2,5-dichloro-4'-phenoxybenzophenone copolymer, sulfonated 463963-71-5DP, Bisphenol AF-4,4'-dichlorobenzophenone-2,5-dichloro-4'-(4-phenoxy)phenoxybenzophenone copolymer, sulfonated
(sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
IT 1455-42-1D, 3,9-Bis(2-hydroxy-1,1-dimethylethyl)-2,4,8,10-tetraoxaspiro[5.5]undecane, mixed ester 1703-58-8D, 1,2,3,4-Butanetetracarboxylic acid, mixed ester 1709-70-2, 1,3,5-Trimethyl-2,4,6-tris[3,5-di(tert-butyl)-4-hydroxybenzyl]benzene 2403-89-6D, 1,2,2,6,6-Pentamethyl-4-piperidinol, mixed ester 10563-26-5D, N,N'-Bis(3-aminopropyl)ethylenediamine, reaction product with triazine 27676-62-6, Tris[3,5-di(tert-butyl)-4-hydroxybenzyl] isocyanurate 75720-76-2D, reaction product with bisaminopropylethylenediamine
(sulfonated polyarylene composition containing hindered phenol and hindered amine antioxidants for proton-conductive membrane)
OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE THIS RECORD (3 CITINGS)

L98 ANSWER 21 OF 21 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 136:265790 HCA Full-text
TITLE: Inorganically modified sulfonated organic

polymer membranes for direct-methanol fuel cells

INVENTOR(S): Pereira Nunes, Suzana; Peinemann, Klaus-Viktor; Rikowski, Eckhard; Paul, Dieter; Fritsch, Detlev

PATENT ASSIGNEE(S): GKSS-Forschungszentrum Geesthacht GmbH, Germany

SOURCE: Eur. Pat. Appl., 7 pp.
CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| EP 1191621 | A2 | 20020327 | EP 2001-113339 | 20010601 |
| | | | <-- | |
| EP 1191621 | A3 | 20050323 | | |
| EP 1191621 | B1 | 20100324 | | |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, CY, TR, AL, MK | | | | |
| DE 10047551 | A1 | 20020418 | DE 2000-10047551 | 20000922 |
| | | | <-- | |
| DE 10047551 | B4 | 20040408 | | |
| AT 462205 | T | 20100415 | AT 2001-113339 | 20010601 |
| | | | <-- | |
| ES 2339216 | T3 | 20100518 | ES 2001-113339 | 20010601 |
| | | | <-- | |

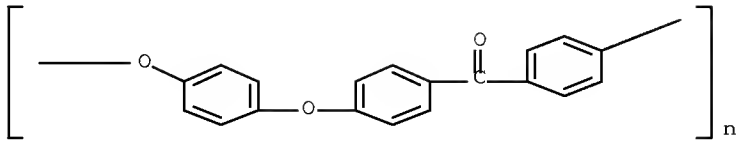
PRIORITY APPLN. INFO.: DE 2000-10047551 A 20000922

AB Inorganically modified organic polymer membranes, especially for direct-methanol fuel cells, consist of an organic polymer, preferably a sulfonated polymer (i.e., a polyether ether ketone), that contains a finely divided and dispersed inorg. phase. The membranes are synthesized by: (1) preparation of the sulfonated polymer (e.g., by sulfonation of the polymer, with SO3, (CH3)3SiSO3Cl, or H2SO4), (2) incorporating a Zr alkoxide, a Ti alkoxide, or a Si alkoxide into the polymer solution with hydrolysis to the corresponding oxide, (3) adding an inorg. phosphate to the casting solution, (4) adding phosphoric acid to the casting solution to form a dispersion of the inorg. phosphate. This membrane offers a low methanol and water permeability and simultaneously a high proton conductivity as well as a high mech. stability.

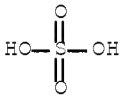
IT 31694-16-3DP, PEEK, sulfonated, reaction products with aminosilanes and metal alkoxides
(membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)

RN 31694-16-3 HCA

CN Poly(oxy-1,4-phenyleneoxy-1,4-phenylenecarbonyl-1,4-phenylene) (CA INDEX NAME)



IT 7664-93-9, Sulfuric acid, uses
(sulfonating agent; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
RN 7664-93-9 HCA
CN Sulfuric acid (CA INDEX NAME)



IPCI H01M0008-10 [I,C]; H01M0008-10 [I,A]; C08J0005-20 [I,C]; C08J0005-22 [I,A]; H01M0008-02 [I,C]; H01M0008-02 [I,A]
IPCR H01M0008-10 [I,C]; H01M0008-10 [I,A]; C08J0005-20 [I,C]; C08J0005-22 [I,A]; H01M0008-02 [I,C]; H01M0008-02 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST sulfonated inorg oxide modified polymer membrane fuel cell; polyether polyketone sulfonated inorg oxide membrane fuel cell; PEEK sulfonated inorg oxide membrane fuel cell; zirconium phosphate oxide polymer membrane fuel cell
IT Titanates
Zirconates
(alkoxides, reaction products with modified sulfonated organic polymers; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Silanes
(alkoxy, reaction products with modified sulfonated organic polymers; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Silanes
(amino, reaction products with modified sulfonated organic polymers, hydrolyzed, membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Fuel cells
(direct-methanol; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Fuel cell separators
(inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)

IT Polyketones
(polyether-, sulfonated, membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Polyethers, uses
(polyketone-, sulfonated, membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Amines, uses
(silyl, reaction products with modified sulfonated organic polymers, hydrolyzed, membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Polysulfones, uses
(sulfonated, reaction products with aminosilanes and metal alkoxides, hydrolyzed, membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Metal alkoxides
(titanium, reaction products with modified sulfonated organic polymers; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT Metal alkoxides
(zirconium, reaction products with modified sulfonated organic polymers; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT 1314-23-4, Zirconium oxide, uses 7631-86-9, Silica, uses 13463-67-7, Titanium dioxide, uses
(dispersed phase, fuel cell membrane containing; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT 530-62-1, 1H-Imidazole, 1,1'-carbonylbis-
(linking reactant; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT 2996-92-1P, Phenyltrimethoxysilane 3087-36-3DP, Titanium tetraethoxide, reaction products with aminosilanes and modified sulfonated organic polymers, hydrolyzed 13765-95-2P, Zirconium phosphate 15438-04-7P, Zirconium phosphate 23519-77-9P, Zirconium tetrapropoxide 31694-16-3DP, PEEK, sulfonated, reaction products with aminosilanes and metal alkoxides 154281-38-6DP, Radel R, sulfonated, reaction products aminosilanes or metal alkoxides, hydrolyzed
(membranes; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
IT 4353-77-9, Chlorosulfuric acid, trimethylsilyl ester 7446-11-9, Sulfur trioxide, uses 7664-93-9, Sulfuric acid, uses
(sulfonating agent; inorganically modified sulfonated organic polymer membranes for direct-methanol fuel cells)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Anon | | | | DE 19909930 A1 | HCA |
| Anon | | | | US 6059943 A | HCA |
| Anon | | | | WO 9811614 A1 | HCA |

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

----------(BALANCE OF REFS FROM CLAIM 1 NOT IN OTHER CATEGORIES)-----

=> D L100 1-9 IBIB ABS HITSTR HITIND RETABLE

L100 ANSWER 1 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 146:522662 HCA Full-text
TITLE: Ether nitrile copolymers containing sulfonic acid groups for PEM (polymer electrolyte membrane) application
INVENTOR(S): Guiver, Michael D.; Gao, Yan; Robertson, Gilles P.
PATENT ASSIGNEE(S): National Research Council of Canada, Can.
SOURCE: Can. Pat. Appl., 110 pp.
CODEN: CPXXEB
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| CA 2527445 | A1 | 20070518 | CA 2005-2527445 <-- | 200511 18 |
| US 20070292731 | A1 | 20071220 | US 2005-281584 <-- | 200511 18 |
| US 7645856 | B2 | 20100112 | | |

PRIORITY APPLN. INFO.: US 2004-628910P T0 200411 19 <--

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB Ether nitrile copolymers containing sulfonic acid groups, including wholly aromatic poly(aryl ether ether nitrile)s containing sulfonic acid groups (SPAEEN)s, and poly(phthalazinone ether ketone nitrile) copolymers containing sulfonic acid groups (SPPEKN)s, intended for fuel cells applications as proton conducting membrane materials, were prepared

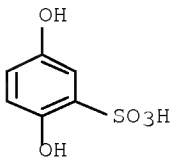
IT 851869-50-6P, 4,4'-Biphenol-2,6-difluorobenzonitrile-potassium 2,5-dihydroxybenzenesulfonate copolymer
936855-30-0P, 2,6-Difluorobenzonitrile-hydroquinone-hydroquinonesulfonic acid copolymer
(polymer electrolyte membrane; manufacture of ether nitrile copolymers containing sulfonic acid groups for PEM application)

RN 851869-50-6 HCA

CN Benzenesulfonic acid, 2,5-dihydroxy-, potassium salt (1:1), polymer with [1,1'-biphenyl]-4,4'-diol and 2,6-difluorobenzonitrile (CA INDEX NAME)

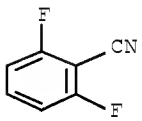
CM 1

CRN 21799-87-1
CMF C6 H6 O5 S . K



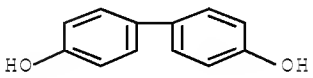
CM 2

CRN 1897-52-5
CMF C7 H3 F2 N



CM 3

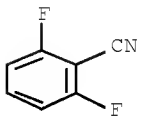
CRN 92-88-6
CMF C12 H10 O2



RN 936855-30-0 HCA
CN Benzenesulfonic acid, 2,5-dihydroxy-, polymer with 1,4-benzenediol and 2,6-difluorobenzonitrile (CA INDEX NAME)

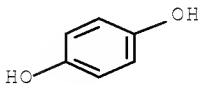
CM 1

CRN 1897-52-5
CMF C7 H3 F2 N



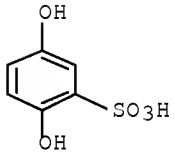
CM 2

CRN 123-31-9
CMF C6 H6 O2



CM 3

CRN 88-46-0
CMF C6 H6 O5 S



IPCI C08G0065-40 [I,A]; C08G0065-00 [I,C*]; C08J0005-22 [I,A];
C08J0005-20 [I,C*]
IPCR C08G0065-00 [I,C]; C08G0065-40 [I,A]; C08J0005-20 [I,C]; C08J0005-22
[I,A]
CC 37-3 (Plastics Manufacture and Processing)
Section cross-reference(s): 52
ST fuel cell membrane ether nitrile
copolymer; sulfonic acid group ether nitrile copolymer;
polyphthalazinone ether ketone nitrile sulfonic acid; PEM
fuel cell sulfonic acid ether nitrile copolymer;
polymer electrolyte membrane fuel cell
membrane
IT Fuel cell separators
Polymer electrolytes
(manufacture of ether nitrile copolymers containing sulfonic acid groups
for PEM application)
IT 851869-50-6P, 4,4'-Biphenol-2,6-difluorobenzonitrile-
potassium 2,5-dihydroxybenzenesulfonate copolymer 879296-39-6P,
4,4'-Biphenol;2,6-difluorobenzonitrile;sodium
2,8-dihydroxynaphthalene-6-sulfonate copolymer 936855-30-0P
, 2,6-Difluorobenzonitrile-hydroquinone-hydroquinonesulfonic acid
copolymer
(polymer electrolyte membrane; manufacture of ether nitrile
copolymers containing sulfonic acid groups for PEM application)

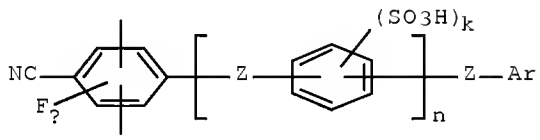
L100 ANSWER 2 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 145:106788 HCA Full-text
TITLE: Membrane-electrode assembly
for fuel cell
INVENTOR(S): Otsuki, Toshitaka; Kaneoka, Takeshi; Iguchi,

Masaru; Soma, Hiroshi
PATENT ASSIGNEE(S): Jsr Ltd., Japan; Honda Motor Co., Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 34 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2006172861 | A | 20060629 | JP 2004-362662 | 200412 15 <-- |

PRIORITY APPLN. INFO.: JP 2004-362662 200412 15 <--

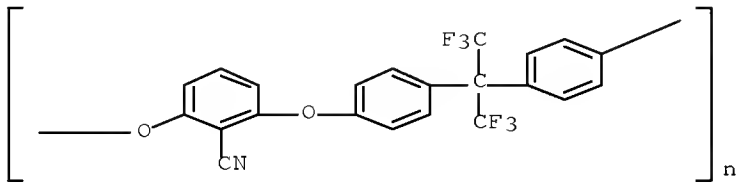
GI




AB The assembly has a solid polymer electrolyte membrane bonded between a pair of electrodes containing a gas diffusion layer and a catalyst layer contacting the electrolyte membrane; where the electrolyte membrane comprising a sulfonated polyarylene having structural unit I [Z = -CO, -SO2, -SO, -CONH, -COO, -(CF2)i, -C(CF3)2, -(CH2)j, -C(CH3)2, -O, -S, and/or direct bond; i = integer 1-10; j = integer 1-10; Ar = aromatic group with -SO3H substituent; m = 1 or 2; n = integer 0-10; and k = integer 1-4].

IT 193410-37-6
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)

RN 193410-37-6 HCA
CN Poly[oxy(2-cyano-1,3-phenylene)oxy-1,4-phenylene[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]-1,4-phenylene] (CA INDEX NAME)




IPCI H01M0008-02 [I,A]; H01M0008-10 [N,A]

IPCR H01M0008-02 [I,A]; H01M0008-02 [I,C]; H01M0008-10 [N,C]; H01M0008-10 [N,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST fuel cell electrode electrolyte membrane sulfonated polyarylene
IT Polyethers, uses
(cardo; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Fuel cell electrodes
Fuel cell electrolytes
Polymer electrolytes
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Carbon black, uses
Fluoropolymers, uses
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Polyethers, uses
(fluorine-containing; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Polyketones
(polyether-, fluorine-containing; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Fluoropolymers, uses
(polyether-; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Fluoropolymers, uses
(polyether-polyketone-; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Cardo polymers
(polyethers; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT Polyethers, uses
(polyketone-, fluorine-containing; electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT 7440-06-4, Platinum, uses
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT 9002-84-0, PTFE
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT 895145-23-0D, hydrolyzed 895145-26-3D, hydrolyzed 895145-28-5D, hydrolyzed
(electrolyte membranes containing sulfonated polyarylenes for membrane-electrode assemblies in fuel cells)
IT 69266-28-0 122325-09-1 193410-36-5 193410-37-6 849729-09-5 895145-18-3
(electrolyte membranes containing sulfonated

polyarylenes for membrane-electrode assemblies in fuel cells)

L100 ANSWER 3 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 145:66289 HCA Full-text
TITLE: Membrane-electrode joints for polymer-electrolyte fuel cells, and same fuel cell system
INVENTOR(S): Kim, Hee Tak; Park, Yeong Mi; Yoon, Hae Kwon
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea
SOURCE: Jpn. Kokai Tokkyo Koho, 17 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2006156397 | A | 20060615 | JP 2005-343956 <-- | 200511 29 |
| KR 2006059455 | A | 20060602 | KR 2004-98553 <-- | 200411 29 |
| US 20060141314 | A1 | 20060629 | US 2005-291102 <-- | 200511 29 |
| US 7625650 | B2 | 20091201 | | |
| PRIORITY APPLN. INFO.: | | | KR 2004-98553 A <-- | 200411 29 |

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

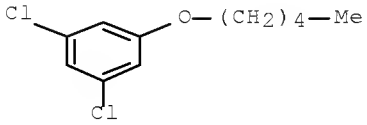
AB The joints employs block polymer electrolyte films constituted by hydrophobic blocks and hydrophillic blocks. The joints show high physicochem. stability and hydrogen ion conductivity

IT 891483-30-0D, sulfonated
(membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)

RN 891483-30-0 HCA
CN Benzoic acid, 4-[4-(4-hydroxyphenoxy)phenoxy]-, polymer with 1,3-dichloro-5-(pentyloxy)benzene, block (9CI) (CA INDEX NAME)

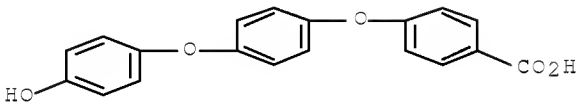
CM 1

CRN 891483-29-7
CMF C11 H14 Cl2 O



CM 2

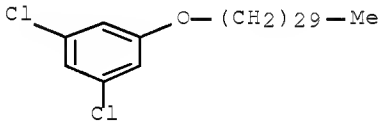
CRN 142753-98-8
CMF C19 H14 O5



IT 891483-28-6DP, sulfonated
(membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
RN 891483-28-6 HCA
CN Benzoic acid, 4-[4-(4-hydroxyphenoxy)phenoxy]-, polymer with 1,3-dichloro-5-(triacontyloxy)benzene, block (9CI) (CA INDEX NAME)

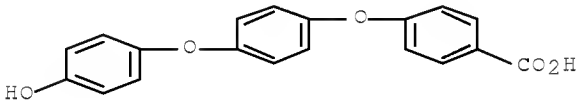
CM 1

CRN 891483-27-5
CMF C36 H64 Cl2 O



CM 2

CRN 142753-98-8
CMF C19 H14 O5



IPCI H01M0008-02 [I,A]; H01M0008-10 [I,A]; C08J0005-22 [I,A]; C08J0005-20 [I,C*]; H01B0001-06 [N,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell electrolyte hydrophobic hydrophillic block copolymer
IT Fuel cell electrolytes

Polyelectrolytes
(fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
IT Polyketones
(polyether-, block, sulfonated, membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
IT Polyethers, uses
(polyketone-, block, sulfonated, membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
IT Fuel cells
(polymer electrolyte; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
IT 891483-30-0D, sulfonated
(membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
IT 891483-28-6DP, sulfonated
(membrane electrolytes; fuel cell membrane-electrode joints containing hydrophobic-hydrophillic block copolymers)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

L100 ANSWER 4 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:327214 HCA Full-text
TITLE: Polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell
AUTHOR(S): Yin, Yan; Yamada, Otoo; Fang, Jianhua; Tanaka, Kazuhiro; Kita, Hidetoshi; Okamoto, Ken-ichi
CORPORATE SOURCE: Department of Advanced Materials Science and Engineering, Faculty of Engineering, Yamaguchi University, Ube, Yamaguchi, 755-8611, Japan
SOURCE: Transactions of the Materials Research Society of Japan (2004), 29(3), 1035-1038
CODEN: TMRJE3; ISSN: 1382-3469
PUBLISHER: Materials Research Society of Japan
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A series of novel sulfonated polyimides (SPIs) were prepared from 1,4,5,8-naphthalenetetracarboxylic dianhydride (NTDA), sulfonated diamines such as bis(3-sulfopropoxy) benzidine (BSPB) and 4,4'-bis(4-amino-phenoxy)biphenyl-3,3'-disulfonic acid (BAPBDS), and common nonsulfonated diamine monomers. Membranes were prepared by solution casting from m-cresol. Proton conductivity was measured as functions of relative humidity (RH) and water volume fraction. These SPIs showed high proton conductivities at high RHs (>80%), which were comparable to or higher than those of Nafion 117. BSPB-based SPIs displayed percolation thresholds slightly higher than that of Nafion and lower than that of BAPBDS-based SPI. Methanol permeation behavior of these SPI membranes was investigated by liquid-liquid permeation method. Most of the SPI membranes displayed lower methanol permeabilities than those of Nafion membrane at 30 and 50°C. As a result, the ratio of proton conductivity (σ) to methanol permeability (PM), Φ, for these SPI membranes was much larger than that, of Nafion, indicating great potential for direct methanol fuel cell application.
IT 865486-35-7

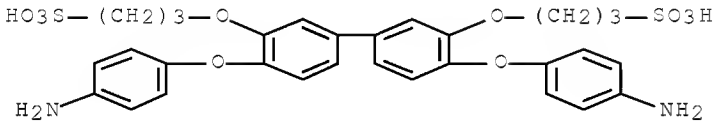
(polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)

RN 865486-35-7 HCA

CN 1-Propanesulfonic acid, 3,3'-[[4,4'-(4-aminophenoxy)[1,1'-biphenyl]-3,3'-diyl]bis(oxy)]-, polymer with [2]benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone and 4,4'-[[1,1'-biphenyl]-4,4'-diylbis(oxy)]bis[benzenamine] (9CI) (CA INDEX NAME)

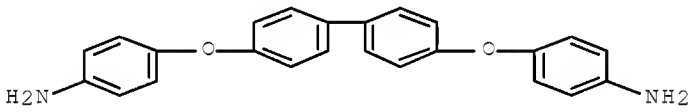
CM 1

CRN 865486-34-6
CMF C30 H32 N2 O10 S2



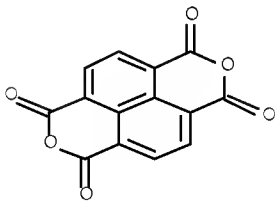

CM 2

CRN 13080-85-8
CMF C24 H20 N2 O2




CM 3

CRN 81-30-1
CMF C14 H4 O6




CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 52

ST polymer electrolyte membrane sulfonated polyimide methanol fuel cell

IT Permeation
(of methanol; polymer electrolyte membranes from novel

sulfonated polyimides for direct methanol fuel cell)
IT Sorption
(of water vapor; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Polyimides, uses
(polyether-, sulfo-containing; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Polysulfones, uses
(polyimide-, sulfo group-containing; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Polyethers, uses
(polyimide-, sulfo-containing; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Fuel cell separators
Membranes, nonbiological
Polymer electrolytes
(polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Polyimides, uses
(polysulfone-, sulfo group-containing; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Ionic conductivity
(proton; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT Polyimides, uses
(sulfo group-containing; polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT 500295-68-1, 1,4,5,8-Naphthalenetetracarboxylic dianhydride-4,4'-bis(4-aminophenoxy)biphenyl-3,3'-disulfonic acid copolymer 500295-69-2 648900-41-8, 1,4,5,8-Naphthalenetetracarboxylic dianhydride-bis(2-sulfopropoxy)benzidine copolymer 648900-42-9, 1,4,5,8-Naphthalenetetracarboxylic dianhydride-bis(3-sulfopropoxy)benzidine copolymer 696615-46-0 696615-88-0 852409-04-2 852409-06-4 865486-32-4 865486-33-5 865486-35-7
(polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
IT 67-56-1, Methanol, uses
(polymer electrolyte membranes from novel sulfonated polyimides for direct methanol fuel cell)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Acres, G | 2001 | 100 | 60 | J Power Sources | HCA |
| Alberti, G | 2001 | 185 | 73 | J Membr Sci | HCA |
| Besse, S | 2002 | 5 | 109 | J New Mat Electroche | HCA |
| Cornet, N | 2000 | 3 | 33 | J New Mat Electroche | HCA |
| Edmondson, C | 2002 | 152-1 | 355 | Solid State Ionics | HCA |

| | | | | | |
|---|---|---|---|---|---|
| Fang, J | 2002 | 35 | 9022 | Macromolecules | HCA |
| Genies, C | 2001 | 42 | 359 | Polymer | HCA |
| Genova-Dimitrova, P | 2001 | 185 | 59 | J Membr Sci | HCA |
| Guo, X | 2002 | 35 | 6707 | Macromolecules | HCA |
| Kim, H | 2001 | 42 | 486 | Polymer Preprints (A | HCA |
| Kim, J | 2002 | 207 | 129 | J Membr Sci | HCA |
| Kreuer, K | 2001 | 185 | 29 | J Membr Sci | HCA |
| Pivovar, B | 1999 | 154 | 155 | J Membr Sci | HCA |
| Savadogo, O | 1998 | 1 | 47 | J New Mater Electroc | HCA |
| Sone, Y | 1996 | 143 | 1254 | J Electrochem Soc | HCA |
| Staiti, P | 2001 | 188 | 71 | J Membr Sci | HCA |
| Watari, T | 2003 | 29 | 165 | Kagaku Kogaku Ronbun | HCA |
| Yin, Y | 2003 | 32 | 328 | Chem Letters | HCA |
| Yin, Y | 2003 | 44 | 4509 | Polymer | HCA |

L100 ANSWER 5 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 143:100266 HCA Full-text
TITLE: Proton-conductive electrolyte and fuel cell
INVENTOR(S): Muneuchi, Atsuo; Nishide, Hiroyuki; Masuyama, Toru
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea
SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 2
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005171087 | A | 20050630 | JP 2003-413247 <-- | 200312 11 |
| US 20050142412 | A1 | 20050630 | US 2004-8611 <-- | 200412 10 |
| PRIORITY APPLN. INFO.: | | | JP 2003-413247 A <-- | 200312 11 |
| | | | KR 2004-102209 A <-- | 200412 07 |

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The electrolytes contains a polyphenylene oxide main chain and a sulfonatoalkoxy group side chain. The fuel cell has an electrolyte membrane, containing the above electrolyte, between a pair of electrodes; where a part of the electrode contains the electrolyte. The electrolyte is preferably manufactured by treatment of a catechol with an alkane sultone and oxidative polymerization of the resulting sulfonatoalkoxyphenol. In the fuel cell, the electrolyte is used for the electrolyte membrane and in electrodes. The electrolytes show good heat resistance and are capable of forming films by casting, etc.

IT 856680-95-0DP, hydrolyzed
(proton-conductive sulfonatoalkoxy-containing polyphenylene

oxide electrolytes showing good heat resistance for fuel cells)

RN 856680-95-0 HCA

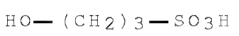
CN 1-Propanesulfonic acid, 3-[2-hydroxy-3(or 6)-methylphenoxy]-, disodium salt, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 856680-94-9
CMF C10 H14 O5 S
CCI IDS

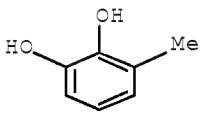
CM 2

CRN 15909-83-8
CMF C3 H8 O4 S



CM 3

CRN 488-17-5
CMF C7 H8 O2



IPCI C08G0065-44 [ICM,7]; C08G0065-00 [ICM,7,C*]; H01B0001-06 [ICS,7]; H01M0008-02 [ICS,7]; H01M0008-10 [ICS,7]

IPCR C08G0065-00 [I,C*]; C08G0065-44 [I,A]; H01B0001-06 [I,A]; H01B0001-06 [I,C*]; H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-10 [I,A]; H01M0008-10 [I,C*]

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 25, 35, 38

ST proton conductive sulfonatoalkoxy polyphenylene oxide fuel cell electrode; heat resistance proton conductive sulfonatoalkoxy polyphenylene oxide; polymer electrolyte fuel cell sulfonatoalkoxy polyphenylene oxide; oxidative polymn sulfonatoalkoxyphenol fuel cell electrolyte

IT Fuel cells
(polymer electrolyte; proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)

IT Fuel cell electrodes
Fuel cell electrolytes
Polymer electrolytes
(proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)

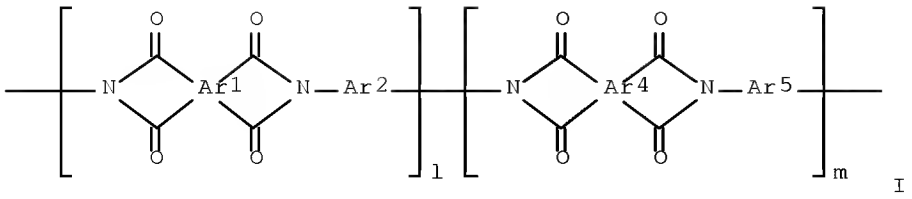
IT Ionic conductors
(protonic; proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)
IT Polyoxyphenylenes
(sulfo-containing; proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)
IT 856680-95-0DP, hydrolyzed 856705-16-3DP, hydrolyzed
856859-88-6DP, hydrolyzed 856859-94-4DP, hydrolyzed
(proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)
IT 856705-15-2P
(proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)
IT 120-80-9, Catechol, reactions 488-17-5, 3-Methylcatechol
1120-71-4, 1,3-Propanesultone
(proton-conductive sulfonatoalkoxy-containing polyphenylene oxide electrolytes showing good heat resistance for fuel cells)

L100 ANSWER 6 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 142:339074 HCA Full-text
TITLE: Crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells
INVENTOR(S): Okamoto, Kenichi; Kita, Hidetoshi; Yamada, Nario; Yin, Yan; Hirano, Tetsuji; Kiuchi, Masayuki
PATENT ASSIGNEE(S): Yamaguchi Technology Licensing Organization Ltd., Japan; Ube Industries, Ltd.
SOURCE: Jpn. Kokai Tokkyo Koho, 27 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2005082726 | A | 20050331 | JP 2003-317413 | 200309 09 <-- |
| JP 4554179 | B2 | 20100929 | | |
| JP 2010235946 | A | 20101021 | JP 2010-100085 | 201004 23 <-- |

PRIORITY APPLN. INFO.: JP 2003-317413 A3 200309 09 <--

GI



I

AB The polyimides are crosslinked products of acid-terminated sulfonated polyimides I (Ar1, Ar4 = aromatic ring-containing tetravalent residue; Ar2 = sulfo- or sulfo derivative-substituted divalent aromatic ring residue; Ar5 = sulfo- or sulfo derivative-free divalent aromatic ring residue; l ≥ 1; m ≥ 0) with ≥3-functional aromatic amines. The polyimides are manufactured by (1) reacting Mb mol of aromatic diamines with Ma mol of aromatic tetracarboxylic acids in mol. ratio Ma/Mb 1.03-1.5 in organic solvents to give organic solvent-soluble aromatic tetracarboxylic acid residue-terminated sulfonated polyimides, (2) adding ≥3-functional aromatic amines to the acid-terminated polyimide solns. at ≤100° to satisfy approx. equal mol of the terminal acid residues and the amino groups, and (3) heating the mixts. at 110-350° for removal of the solvents. Manufacture of films of the crosslinked sulfonated polyimides by casting or applying the mixts obtained by the above (2) process on supports and heating at 110-350° for solvent removal is also claimed. The polyimides have high ion exchange capacity and proton conductivity and improved water resistance, dimensional change in water absorption, and MeOH permeability.

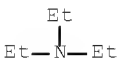
IT 848469-45-4P 848469-47-6P 848469-48-7P
(crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)

RN 848469-45-4 HCA

CN 1-Propanesulfonic acid, 3,3'-[(4,4'-diamino[1,1'-biphenyl]-2,2'-diyl)bis(oxy)]bis-, polymer with 4,4',4''-[1,3,5-benzenetriyltris(oxy)]tris[benzenamine] and [2]benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone, compd. with N,N-diethylethanamine (9CI) (CA INDEX NAME)

CM 1

CRN 121-44-8
CMF C6 H15 N

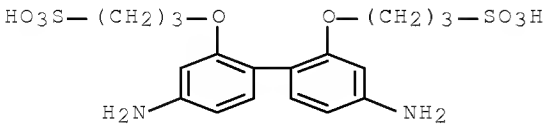


CM 2

CRN 848469-44-3
CMF (C24 H21 N3 O3 . C18 H24 N2 O8 S2 . C14 H4 O6)x
CCI PMS

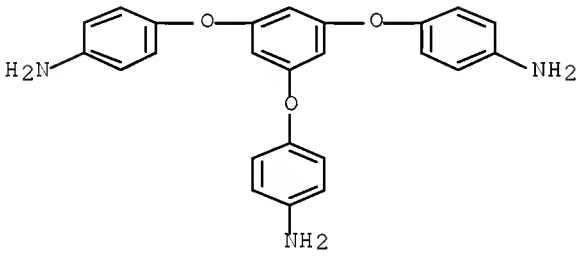
CM 3

CRN 532967-92-3
CMF C18 H24 N2 O8 S2



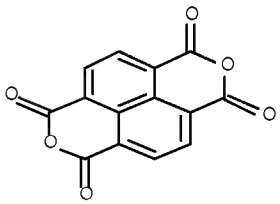
CM 4

CRN 102852-92-6
CMF C24 H21 N3 O3



CM 5

CRN 81-30-1
CMF C14 H4 O6

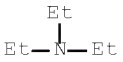


RN 848469-47-6 HCA
CN 1-Propanesulfonic acid, 3,3'-[(4,4'-diamino[1,1'-biphenyl]-2,2'-diyl)bis(oxy)]bis-, polymer with 4,4',4''-[1,3,5-benzenetriyltris(oxy)]tris[benzenamine], [2]benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone and 4,4'-[[1,1'-biphenyl]-4,4'-diylbis(oxy)]bis[benzenamine], compd. with N,N-diethylethanamine (9CI) (CA INDEX NAME)

CM 1

CRN 121-44-8

CMF C6 H15 N

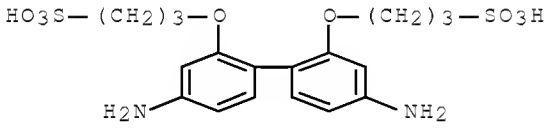


CM 2

CRN 848469-46-5
CMF (C24 H21 N3 O3 . C24 H20 N2 O2 . C18 H24 N2 O8 S2 . C14 H4 O6)x
CCI PMS

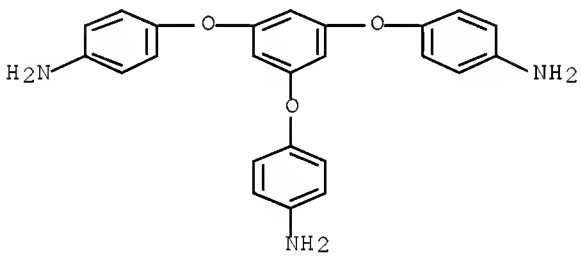
CM 3

CRN 532967-92-3
CMF C18 H24 N2 O8 S2



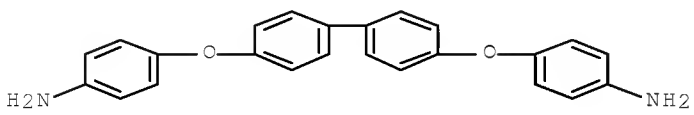
CM 4

CRN 102852-92-6
CMF C24 H21 N3 O3



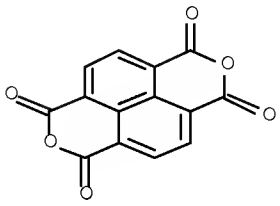
CM 5

CRN 13080-85-8
CMF C24 H20 N2 O2



CM 6

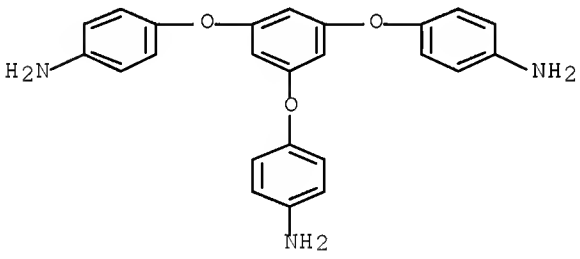
CRN 81-30-1
CMF C14 H4 O6



RN 848469-48-7 HCA
CN 1-Propanesulfonic acid, 3,3'-[(4,4'-diamino[1,1'-biphenyl]-3,3'-diyl)bis(oxy)]bis-, polymer with 4,4',4''-[1,3,5-benzenetriyltris(oxy)]tris[benzenamine] and [2]benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone (9CI) (CA INDEX NAME)

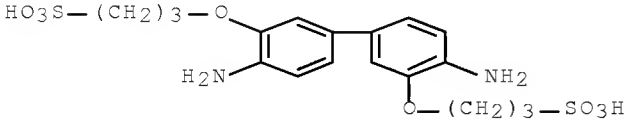
CM 1

CRN 102852-92-6
CMF C24 H21 N3 O3



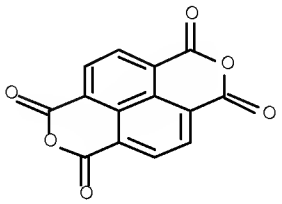
CM 2

CRN 56716-06-4
CMF C18 H24 N2 O8 S2



CM 3

CRN 81-30-1
CMF C14 H4 O6



IPCI C08G0073-10 [I,A]; C08G0073-00 [I,C*]; C08J0003-24 [I,A]
IPCR C08G0073-00 [I,C*]; C08G0073-10 [I,A]; C08J0003-24 [I,A];
C08J0003-24 [I,C*]; H01B0001-06 [I,A]; H01B0001-06 [I,C*];
H01M0008-02 [I,A]; H01M0008-02 [I,C*]; H01M0008-10 [I,A];
H01M0008-10 [I,C*]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST crosslinked sulfonated polyimide electrolyte membrane
fuel cell
IT Polymer electrolytes
(crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells
)
IT Fuel cells
(polymer electrolyte; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT Polyimides, uses
(sulfo-containing, aromatic amine-crosslinked; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT 848469-45-4P 848469-47-6P 848469-48-7P
(crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT 108-73-6, 1,3,5-Trihydroxybenzene 350-46-9, 4-Fluoronitrobenzene
(crosslinker from; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT 102852-92-6P
(crosslinker; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT 696614-99-0P, Sodium 3-(3'-nitrophenoxy)propanesulfonate
696615-10-8P 696615-19-7P
(monomer from; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)
IT 88-75-5, o-Nitrophenol 554-84-7, m-Nitrophenol 55788-44-8,
Sodium 3-bromopropanesulfonate
(monomer from; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)

IT 56716-06-4P 532967-92-3P, 2,2'-Bis(3-sulfopropoxy)benzidine
(monomer; crosslinked sulfonated polyimides and their manufacture for polymer electrolyte membranes in fuel cells)

L100 ANSWER 7 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 140:149110 HCA Full-text
TITLE: Protonic acid-containing crosslinkable resins, their crosslinked products, and their use in fuel cells
INVENTOR(S): Ishikawa, Junichi; Nakata, Tomoyuki; Fujiyama, Akiko; Omi, Katsuhiko; Tamai, Masashi
PATENT ASSIGNEE(S): Mitsui Chemicals Inc., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 78 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| JP 2004026889 | A | 20040129 | JP 2002-181632 | 20020621 <-- |
| PRIORITY APPLN. INFO.: | | | JP 2002-181632 | 20020621 <-- |

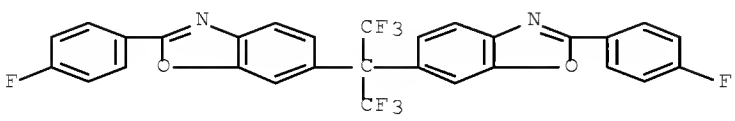
AB The resins have crosslinkable groups (e.g., carbonyl, C1-10 alkyl bonded to aromatic ring) and protonic acid groups (e.g., SO3H) and can be crosslinked by light, heat, or electron beam. Photocrosslinked products of the resins and fuel cell ion-conducting polymer membranes obtained from the resins or the photocrosslinked products are also claimed. The crosslinked resins have high ion conductivity and MeOH resistance, so that the fuel cells such as DFFC using the membranes have high durability.

IT 515144-54-4P
(blends with sulfonated polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

RN 515144-54-4 HCA
CN 1,4-Benzenediol, 2,3,5,6-tetramethyl-, polymer with 6,6'-[2,2,2-trifluoro-1-(trifluoromethyl)ethylidene]bis[2-(4-fluorophenyl)benzoxazole] (CA INDEX NAME)

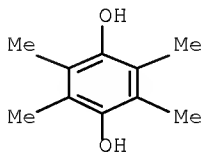
CM 1

CRN 121778-05-0
CMF C29 H14 F8 N2 O2



CM 2

CRN 527-18-4
CMF C10 H14 O2




IPCI C08G0069-26 [ICM,7]; C08G0069-00 [ICM,7,C*]; C08G0073-10 [ICS,7]; C08G0073-22 [ICS,7]; C08G0073-00 [ICS,7,C*]; H01B0001-06 [ICS,7]; H01M0008-02 [ICS,7]; H01M0008-10 [ICS,7]
IPCR C08G0069-00 [I,C*]; C08G0069-26 [I,A]; C08G0073-00 [I,C*]; C08G0073-10 [I,A]; C08G0073-22 [I,A]; H01B0001-06 [I,C*]; H01B0001-06 [I,A]; H01M0008-02 [I,C*]; H01M0008-02 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 35, 38
ST crosslinkable resin fuel cell ion conductor membrane; protonic acid photocrosslinked polymer membrane fuel cell; direct methano fuel cell
IT Fuel cells
(DMFC; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Polysulfones, uses
(blends with sulfo-containing compds.; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Crosslinking
(photochem.; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Polyketones
(polyether-, blends with sulfo-containing polymers; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Polyketones
(polyether-, sulfonated, sodium salts, crosslinked, ion-exchanged; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Polyethers, uses
(polyketone-, blends with sulfo-containing polymers; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Polyethers, uses
(polyketone-, sulfonated, sodium salts, crosslinked, ion-exchanged; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT Fuel cell electrolytes
Ionic conductors

(protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT Crosslinking
(radiochem.; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT Polyamides, uses
Polyimides, uses
(sulfo-containing; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT Polyoxyphenylenes
(sulfonated, sodium salts, blends with polyether-polyketones, ion-exchanged; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT Polybenzoxazoles
(sulfonated; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT Crosslinking
(thermal; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 25134-01-4DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sulfonated, sodium salt, ion-exchanged
(assumed monomers, blends with polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 515144-61-3DP, ion-exchanged
(blends with polyamides; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 515144-60-2P
(blends with polyether-polyketones or anthraquinone; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 24938-67-8DP, Poly(2,6-dimethyl-1,4-phenylene oxide), sulfonated, sodium salt, ion-exchanged 515144-58-8DP, ion-exchanged 515144-64-6DP, ion-exchanged
(blends with polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 1323-19-9
(blends with polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 515144-51-1DP, ion-exchanged
(blends with polyimides; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 853-68-9D, ion-exchanged
(blends with polysulfones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 515144-56-6P 515144-57-7P
(blends with sulfo-containing polyimides; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)

IT 25897-65-8P, Bisphenol A-4,4'-difluorobenzophenone copolymer

41205-96-3P
(blends with sulfo-containing polymers; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT 84-65-1, 9,10-Anthracenedione
(blends with sulfo-containing polysulfones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT 127669-56-1P
(blends with sulfonated polyamides; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT 29658-28-4P 87792-34-5P 515144-54-4P
(blends with sulfonated polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT 240405-82-7
(blends with sulfonated polyether-polyketones; protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
IT 515144-36-2DP, ion-exchanged 515144-37-3DP, ion-exchanged
515144-38-4DP, ion-exchanged 515144-39-5DP, ion-exchanged
515144-41-9DP, ion-exchanged 515144-42-0DP, ion-exchanged
651326-38-4DP, sulfonated 651326-39-5DP, ion-exchanged
651326-40-8DP, ion-exchanged
(protonic acid-containing crosslinkable resins for ion-conducting membranes in fuel cells)
OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L100 ANSWER 8 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 138:338636 HCA Full-text
TITLE: Sulfonated six-membered ring polyimides as proton exchange membranes: synthesis and characterization
AUTHOR(S): Gunduz, N.; Inan, T. Y.; Yildiz, E.; McGrath, J. E.
CORPORATE SOURCE: Dep. of Chem. and Cent. for High Performance Polymeric Adhesives and Composites, Virginia Polytechnic Inst. and State Univ., Blacksburg, VA, 24061-0344, USA
SOURCE: Polymeric Materials Science and Engineering ( 2001), 84, 911-912
CODEN: PMSEDG; ISSN: 0743-0515
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The utilization of wholly aromatic six-membered ring polyimides containing pendant sulfonic acid functional groups is of interest for solid polymer electrolyte membrane fuel cells (SPEMFC). The ongoing work reported herein describes the synthesis and characterization of high mol. weight random copolymers of sulfonated polyimides that have been prepared from 1,4,5,8-naphthalene tetracarboxylic dianhydride and appropriate wholly aromatic sulfonated/unsulfonated diamines to control the degree of sulfonation on the final polymer. The sulfonated and unsulfonated control polymers were synthesized via high temperature direct polyimidization method using m-cresol as a solvent. Tough, creasible membranes were obtained via solution casting from m-cresol and they were characterized for mol. weight (IV), chemical composition (NMR, FT-IR,) thermal transition behavior (TGA, DSC), water absorption and conductivity measurements. This paper will also describe

synthesis and characterization of phosphine oxide based sulfonated and unsulfonated diamine monomers and polymers for potential proton exchange membranes for fuel cells.

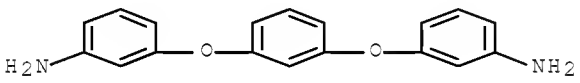
IT 518050-65-2P, 1,3-Bis(3-aminophenoxy)benzene-4,4'-diaminobiphenyl-2,2'-disulfonic acid-1,4,5,8-naphthalene tetracarboxylic dianhydride copolymer
(preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

RN 518050-65-2 HCA

CN [1,1'-Biphenyl]-2,2'-disulfonic acid, 4,4'-diamino-, polymer with [2]benzopyrano[6,5,4-def][2]benzopyran-1,3,6,8-tetrone and 3,3'-[1,3-phenylenebis(oxy)]bis[benzenamine] (9CI) (CA INDEX NAME)

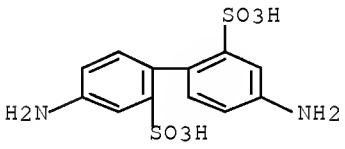
CM 1

CRN 10526-07-5
CMF C18 H16 N2 O2



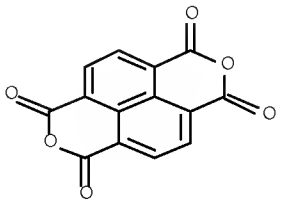

CM 2

CRN 117-61-3
CMF C12 H12 N2 O6 S2




CM 3

CRN 81-30-1
CMF C14 H4 O6




CC 35-5 (Chemistry of Synthetic High Polymers)
Section cross-reference(s): 38

ST sulfonic acid contg polyether polyimide proton exchange membrane prepn

IT Polyimides, preparation
(polyether-, sulfo-containing; preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

IT Polyethers, preparation
(polyimide-, sulfo-containing; preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

IT Cation exchange membranes
(preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

IT 518050-65-2P, 1,3-Bis(3-aminophenoxy)benzene-4,4'-diaminobiphenyl-2,2'-disulfonic acid-1,4,5,8-naphthalene tetracarboxylic dianhydride copolymer
(preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

IT 75925-90-5 302554-20-7
(preparation and characterization of sulfonated six-membered ring polyimides as proton exchange membranes)

RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | Referenced File |
|---|---|---|---|---|---|
| Genies, C | 2001 | 92 | 359 | Polymer | |
| Gunduz, N | 2000 | | | ACS Div Polym Chem P | |
| Laande, G | 1997 | 9 | 84 | Chem Mater | |
| Mercier, R | 1999 | | | 5th European tec | |
| Miyatake, K | 1996 | 29 | 6969 | Macromolecules | HCA |
| Rusanow, A | 1994 | 17 | 115 | Advances in Polymer | |
| Shobha, H | 2000 | 41 | 1298 | ACS Div Polym Chem P | HCA |
| Wang, F | 2000 | 41 | 1401 | ACS Div Polym Chem P | HCA |
| Zhing, Y | 1999 | 40 | 480 | Polym Chem Polym Pre | |
| Zhuang, H | 1998 | | | PhD Dissertation, Vi | |

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

L100 ANSWER 9 OF 9 HCA COPYRIGHT 2010 ACS on STN
ACCESSION NUMBER: 137:281872 HCA Full-text
TITLE: Improved proton conducting membrane from dendrimeric polymers covalently linked into a network structure for fuel cells
INVENTOR(S): Colombo, Daniel; Krumpelt, Michael; Myers, Deborah; Kopasz, John
PATENT ASSIGNEE(S): University of Chicago, USA
SOURCE: PCT Int. Appl., 24 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

| PATENT NO. | KIND | DATE | APPLICATION NO. | DATE |
|---|---|---|---|---|
| WO 2002078110 | A2 | 20021003 | WO 2002-US10004 | |

200203
27
<--

WO 2002078110 A3 20031211
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

US 20030035991 A1 20030220 US 2002-105203
200203
25
<--

US 6977122 B2 20051220
AU 2002307009 A1 20021008 AU 2002-307009
200203
27
<--

US 20060094792 A1 20060504 US 2005-291254
200512
01
<--

US 7195835 B2 20070327
PRIORITY APPLN. INFO.: US 2001-278979P P
200103
27
<--
US 2002-105203 A3
200203
25
<--
WO 2002-US10004 W
200203
27
<--

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The invention provides an ion conducting membrane comprising dendrimeric polymers covalently linked into a network structure. The dendrimeric polymers of the invention have acid functional terminal groups and may be covalently linked via linking compds., cross-coupling reactions, or copolymn. reactions. The invention also provides methods for producing the ion conducting membranes and fuel cells made from the membranes.

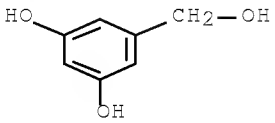
IT 129371-31-9DP, 3,5-Dihydroxybenzyl alcohol homopolymer, methanesulfonate
(improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)

RN 129371-31-9 HCA

CN 1,3-Benzenediol, 5-(hydroxymethyl)-, homopolymer (CA INDEX NAME)

CM 1

CRN 29654-55-5
CMF C7 H8 O3



IPCI H01M0008-10 [ICM,7]; H01B0001-12 [ICS,7]; C08J0005-22 [ICS,7]; C08J0005-20 [ICS,7,C*]; B01D0071-00 [ICS,7]; C08G0083-00 [ICS,7]
IPCR B01D0069-00 [I,C*]; B01D0069-02 [I,A]; B01D0071-00 [I,C*]; B01D0071-52 [I,A]; B01D0071-76 [I,A]; B01D0071-82 [I,A]; C08G0083-00 [I,C*]; C08G0083-00 [I,A]; C08J0005-20 [I,C*]; C08J0005-22 [I,A]; H01B0001-12 [I,C*]; H01B0001-12 [I,A]; H01M0008-10 [I,C*]; H01M0008-10 [I,A]
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38
ST fuel cell proton conducting membrane dendrimeric polymer
IT Polyethers, uses
(dendrimers, carboxyphenoxy or methanesulfonate-terminated, diamine-crosslinked; improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT Polymer networks
(improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT Dendritic polymers
(improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT Dendritic polymers
(polyethers, carboxyphenoxy or methanesulfonate-terminated, diamine-crosslinked; improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT Fuel cells
(solid electrolyte; improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT 107-15-3, 1,2-Diaminoethane, processes
(crosslinking agent; improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
IT 2417-72-3DP, Methyl(p-bromomethylbenzoate), reaction product with 3,5-dihydroxybenzyl alc. homopolymer, polymers with diamines 129371-31-9DP, 3,5-Dihydroxybenzyl alcohol homopolymer, carboxyphenoxy-terminated, polymers with diamines 129371-31-9DP, 3,5-Dihydroxybenzyl alcohol homopolymer, methanesulfonate
(improved proton conducting membrane from dendrimeric polymers covalently linked into network structure for fuel cells)
RETABLE

| Referenced Author (RAU) | Year (RPY) | VOL (RVL) | PG (RPG) | Referenced Work (RWK) | File |
|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Anon | | | US 4871779 A | HCA |
| Anon | | | US 5648186 A | HCA |
| Anon | | | US 6183914 B1 | HCA |

OS.CITING REF COUNT: 10 THERE ARE 10 CAPLUS RECORDS THAT CITE THIS RECORD (10 CITINGS)